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## Tips and tricks for programming in Matlab

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#### 1. Introduction

Matlab is the software developed by the MathWorks, Inc., Natick, USA. In 1984, the first version appeared. Software was primarily used only for the mathematical computation enabling the computation of complicated matrix equations and their systems. All major functions can directly use the matrix as the input. From that year, the software is still under development enlarging the area of the users every year. Matlab became the standard in the area of simulation and modelling and it is used by the researchers and students at universities mainly in the areas of Control Engineering, Power Plant Systems, Aerospace, Bioinformatics, Economics and Statistics. In comparison to other software such as Mathematica or Maple, Matlab has several advantages. Let us mention some. Its open architecture enables sharing all source code among the user community and several different areas are solved and the solution appears usually as a new toolbox. Simulink is the important Matlab enlargement which simplifies the computation very much. You just drag and drop the blocks to the new window from the block libraries and connect them and run the model. Matlab is used not only at universities but also in practice, for instance by NASA or General Motors. Most Matlab users are from the major world countries, such as USA, Japan, China, and India. Nice book was written by Hanselman and Littlefield (Hanselman and Littlefield, 2005). And interesting paper about teaching using Matlab was written by Perutka and Heczko (Perutka & Heczko, 2007). This chapter provides some chosen tips and tricks to the beginners in Matlab programming and should ease the first steps in programming. These tips and tricks are based on the experience of chapter author with teaching Matlab programming in the undergraduate curriculum for several years. The author mostly worked in MATLAB version 6.5, for which tips are. They are unsorted and each chapter provides one tip or trick only.

#### 2. Placing picture as dialog background

Being bored from standard look of GUI created in Matlab? If you create dialog in Matlab using GUIDE or set of functions figure, uimenu, uicontrol and axes, the dialog background is usually based on the settings of the system, for example in older Microsoft Windows it was grey – Windows Classic Theme. However, if you need to have your picture as the figure background, there is possible to use the following solution. Such example is

shown in figure 1. The dialog in this figure contains only 3 grey pushbuttons (online ident., Gr, >>) and background picture.

What to do first? You have to draw the picture in the extern software, for example in Corel DRAW! and save it in one of the formats that Matlab supports, for instance as JPG or BMP. You can get the list of supported formats from the Matlab Help Dialog. Don't forget to write down the width and height of the picture or their ratio. Create new dialog using the command figure or by GUI. Set the size of the new window in accordance with the picture width and height or their ratio. How? If you working with GUIDE, double-click the window in GUIDE and Property Inspector should appear. Change the *Units* property on *Pixels* and after that change in the *Position* property the third and fourth value to the width and height of the figure of the figure function in M-file, include in the list of properties *Units* and *Position* and set them in similar way as was described for the GUI created by GUIDE. Now you need to load the figure in the Matlab Workspace, create axes and put the figure inside them. This tip is based on work of Perutka (Perutka, 2007). Inspire yourself by the following code which will be commented

```
1 STCssu=imread('STCssu.jpg','jpg');
2 axes('Position',[0 0 1 1]);
3 image(STCssu);
4 axis off;
5 clear STCssu
```

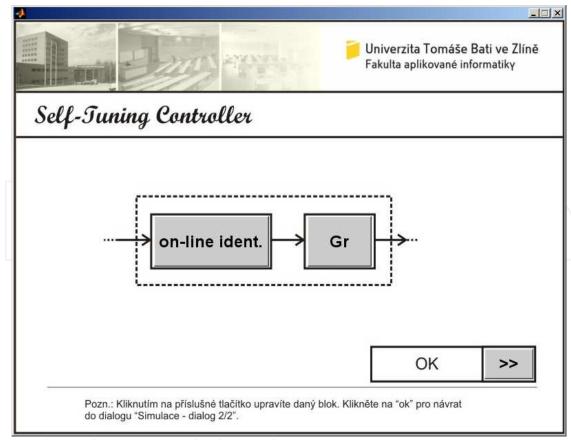


Fig. 1. Dialog with picture as its background

2

This code should be placed in the file where the figure is defined. The line 1 of the code is responsible of loading the picture in the Matlab Workspace using the function image. In this case, *STCssu.jpg* is the name of picture file and the picture is loaded to the *STCssu* variable. Line 2 creates the axes with their range just for all dialog area. Command in line 3 draws the image from the *STCssu* variable to the axes created by line 2. The axes description is hidden by the command on line 4. If you don't re-draw the dialog, you can delete the variable from the Matlab Workspace, as it is shown in line 5. But if you re-call the dialog, don't use line 5. For the dialog re-calling, lines 2 to 4 are enough.

#### 3. Short online help for every object in dialog

Imagine the situation depicted in figure 2. There is a short text "If you click this button, you will open the dialog of setting the controller parameters." in the box. This text is shown if you keep the cursor on the button *Gr* for a while. This might be useful especially in the case of two sorts of objects in dialog (button or edit text) to provide necessary short information what should be written as the text (edit text) or what will happen when the button is pressed. But short information can be displayed over every object in dialog which has the property *TooltipString*.

If you created your dialog by GUIDE, open it in GUIDE again and double click the object for which you would like to create the short help.

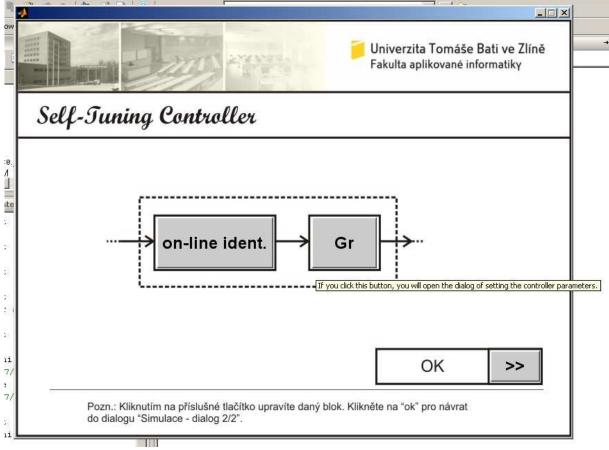


Fig. 2. Dialog with short help

The Property Inspector dialog should appear, find the property denoted as *TooltipString* and write some string as the input. The string you write will appear as the short help for the object after calling the dialog again.

If you created the object by the *uicontrol* function, just read the sample code below

```
6 hButtonClose = uicontrol('Style', 'pushbutton',...
7
8
9
10
11
12
12
13
6 hButtonClose = uicontrol('Style', 'pushbutton',...
'String', 'Close',...
'Parent', hFigure,...
'Tag', 'tButtonClose',...
'Tag', 'tButtonClose',...
'Doltips', 'pixels',...
'Doltipstring', 'Press the button for exit.',...
'Callback', 'closeIt');
```

The code in lines 6 to 13 presents the definition of pushbutton object in the dialog created by commands in M-file. The *TooltipString* property of *uicontrol* is defined in line 12, the text "Press the button for exit." is shown as a short help when the cursor will be on the button "Close".

#### 4. More pictures in one dialog and their control

It is sometime necessary to place more than one picture in the dialog, have a look at figure 3. The dialog in figure 3 includes 9 JPG pictures. The digital clock consists of 8 pictures, 6 pictures are the digits of the clock. The background of analogue clock is the remaining picture. These pictures are shown similarly as is described in "Placing picture as dialog background", it means the pictures are drawn using image function to pre-defined axes. The dialog in figure 3 was created as a set of commands in M-file and it is defined by lines 14 to 24, the *Render* and *DoubleBuffer* properties should be set according to lines 23 and 24.

```
14 hFigure = figure('Units', 'pixels',...
                     'Position', [100 50 770 690],...
15
                     'MenuBar', 'None',...
16
                     'Name', 'Hodiny',...
'Tag', 'tWindow',...
17
18
                     'NumberTitle', 'off',...
19
                     'Resize', 'off'...
'Visible', 'off'...
20
21
22
                     'BackingStore', 'off',...
23
                     'Renderer', 'painters',...
24
                     'DoubleBuffer', 'on');
```

When figure is defined, all axes objects are created, example for one axes object is shown in lines 25 to 33

4

```
31 'XColor', 'k', 'YColor', 'k',...
32 'DrawMode', 'fast',...
33 'Color', 'k');
```

This step is followed by step in which all images are read into Matlab Workspace using the image function, the image file are in the same directory as the source code, for one image the code will be

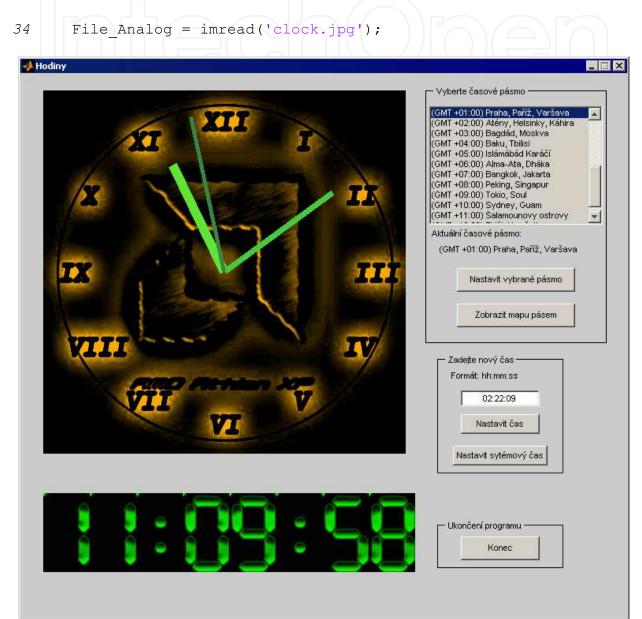


Fig. 3. Dialog with more pictures

Now have a careful look at the following source code, lines 35 - 39

```
35 set(0, 'CurrentFigure', hFigure);
36 set(hFigure, 'CurrentAxes', hAnalog);
37 image(File Analog);
```

38 axis image; 39 axis off;

The source code on lines 35 – 39 shows how to switch among several axes in one dialog. Line 35 gives us an example where the dialog identified by hFigure, line 14, is set as the active one. And line 36 shows us the example of setting one of the axes as the active one. The axes are in the dialog, which is identified by hFigure, line 14, and the axes are identified by hAnalog, line 25. Now you show the chosen picture, line 37, which was read by line 34. Finally, you place the axis just to the borders of the image, line 38, and you hide the ticks, line 39. This tip is based on the example provided by Perutka (Perutka, 2005).

#### 5. Button with your picture

Figure 4 shows the green dialog with two options to be chosen, they are both yellow and black. If you click "Stromek" or "Kytka", new dialog appears. The dialog in figure 4 consists of 3 axes objects to which the pictures are drawn, one axes object shows the background and 2 axes objects show pictures as "buttons".



Fig. 4. Dialog with "2 buttons" with our picture.

Now let us look at the source code, lines 40 – 64. These lines provide the full source code for figure 4. See line 59 or 63. There is another syntax of image function in comparison to line 3. The ButtonDownFcn property is used, its value is set on the name of function or file, which should be called if the picture or axes are clicked. For example if you click on "Kytka", there will be called the file *kytka.m* according to line 63.

```
40 hFigure = figure('Units', 'pixels',...
              'Position', [160 160 470 350],...
41
42
              'MenuBar', 'None',...
43
              'Name', 'Volba',...
              'Tag', 'tOkno',...
44
45
              'NumberTitle', 'off',...
              'Resize','off',...
46
              'Visible','on',...
47
              'BackingStore', 'off', ...
48
              'Renderer', 'painters', ...
49
50
              'DoubleBuffer', 'on');
51
       hlavniObr=imread('vyberte.jpg');
52
       prvniObr=imread('stromek.jpg');
53
       druhyObr=imread('kytka.jpg');
54
       hlavniAxes=axes('Position',[0 0 1 1]);
55
       image(hlavniObr);
56
       axis off
       prvniAxes=axes('Units','pixels',...
57
          'Position', [200 152 230 35]);
58
59
       image(prvniObr, 'ButtonDownFcn', 'stromek');
60
       axis off
       druhyAxes=axes('Units','pixels',...
61
62
           'Position', [200 65 230 35]);
       image(druhyObr, 'ButtonDownFcn', 'kytka');
63
64
       axis off
```

#### 6. New picture on button click

This task is connected with the previous example, see similar figure 5 and lines 65 to 71. If you click "the button", the button changes the color for a while, i.e. for 0.5 s, line 69. Actually, you set the axes, which will be "the button", as active, line 65. You read the image to the Matlab Workspace variable, line 66, and draw it in the selected axes, line 67, and hide the description of axes, line 68. To keep the illusion of the button, you draw the previous picture back, line 70, together with the option to be clicked again, i.e. there is ButtonDownFcn property included, line 70, there will be called the file *kytka.m* if you click "the button".

```
65 set(hFigure, 'CurrentAxes', druhyAxes);
66 cervKytka=imread('kytka1.jpg');
67 image(cervKytka);
68 axis off
69 pause(0.5);
70 image(druhyObr, 'ButtonDownFcn', 'kytka');
71 axis off
```



Fig. 5. New picture on "button" click.

# 7. Set of buttons with your pictures in dialog, each button is pressed on given key

Typical task for simple menu controlled by keyboard is the following one. You have a list of menu items such as in figure 6. The list is controlled by 3 keys. First key is used for moving up. One press means one item up. Second key is used for moving down and the last key selects the menu item. Menu in figure 6 has five items namely New game, Load game, Game help, Options, Exit. Function for menu control is shown as the source code in lines 72 to 173. Each menu item is represented by its own axes object. There are two pictures for each menu item, black for inactive state and grey for active item. The grey picture is shown when the item is selected or chosen. Moving up is realized by "w" key - line 75, down by "s" key line 79 and selection by "1" key - line 83. You should be familiar with the basics of programming in Matlab to fully understand it. Let us describe the function in brief. All necessary variables are loaded before the function body using the line 73, file defineglobal.m Lines 74 to 105 show the menu control and selection. Line 74 shows how to load the key pressed - there is CurrentCharacter property for get function, and dMenu is the dialog identifier, lines 75 - 82 show moving up ad down. Lines 106 – 172 show the way of changing the pictures during move or selection. For one change of menu item all pictures are redrawn. This tip is based on the work of Hrubos consulted by me (Hrubos, 2009).

```
function keyboardmenu
72
73
       defineglobal
74
       switch lower(get(dMenu, 'CurrentCharacter'))
75
           case 'w' % up
              if kPosition <= 5 && kPosition > 1
76
77
                     kPosition = kPosition - 1;
78
              end
79
           case 's'
                    % down
80
              if kPosition < 5 && kPosition >= 1
81
                     kPosition = kPosition + 1;
82
              end
           case 'l'
83
84
              if kPosition == 1
                     set(dMenu,'Visible','off');
85
86
                     levelA
87
              end
88
              if kPosition == 2
89
                     loadgame
                     set(dLoad, 'Visible', 'on');
90
91
              end
92
              if kPosition == 3
93
                     gamehelp
94
              end
95
              if kPosition == 4
96
                     set(dOptions, 'Visible', 'on');
97
              end
98
              if kPosition == 5
                     set(dMenu,'Visible','off');
99
100
                     clear all
101
                     exitmenu = 1;
102
              end
103
           otherwise
104
              wavplay(zMenu, zMenuF)
105
       end
106
       if exitmenu == 1
107
              clear all
108
              return
109
       else
           set(dMenu, 'Units',
110
                                'pixels');
111
           if kPosition == 1
112
             set(0,'CurrentFigure',dMenu);
113
             set(dMenu, 'CurrentAxes', dMenuNewGameAxes);
114
             image(oNewGame1); axis off;
             set(dMenu, 'CurrentAxes', dMenuLoadGameAxes);
115
116
             image(oLoadGame0); axis off;
117
             set(dMenu, 'CurrentAxes', dMenuGameHelpAxes);
118
             image(oGameHelp0); axis off;
119
             set(dMenu, 'CurrentAxes', dMenuOptionsAxes);
             image(oOptions0); axis off;
120
121
             set(dMenu, 'CurrentAxes', dMenuExitAxes);
122
             image(oExit0); axis off;
```

<pre>223 elseif kPosition == 2 234 set(0, 'CurrentFigure', dMenuNewGameAxes); 235 set(dMenu, 'CurrentAxes', dMenuNewGameAxes); 236 image(oCadGame1); axis off; 237 image(oCadGame1); axis off; 238 image(oCatementAxes', dMenuOptionsAxes); 239 image(oCatementAxes', dMenuOptionsAxes); 230 image(oCatementAxes', dMenuOptionsAxes); 231 image(oCatementAxes', dMenuOptionsAxes); 232 image(oCatementAxes', dMenuOptionsAxes); 233 image(oCatementAxes', dMenuDewGameAxes); 234 image(oCatementAxes', dMenuNewGameAxes); 235 elseif kPosition == 3 236 set(0.Menu, 'CurrentAxes', dMenuNewGameAxes); 238 image(oCatementAxes', dMenuDewGameAxes); 239 image(oCatementAxes', dMenuDewGameAxes); 230 image(oCatementAxes', dMenuDatGameAxes); 231 image(oCatementAxes', dMenuDatGameAxes); 232 image(oCatementAxes', dMenuDatGameAxes); 233 image(oCatementAxes', dMenuDatGameAxes); 234 image(oCatementAxes', dMenuDatGameAxes); 235 image(oCatementAxes', dMenuDatGameAxes); 236 image(oCatementAxes', dMenuDatGameAxes); 237 image(oLatGameO); axis off; 238 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 239 image(oLatGameO); axis off; 231 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 231 image(oLatGameO); axis off; 233 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 234 image(oLatGameO); axis off; 235 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 236 image(oLatGameO); axis off; 237 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 238 image(oLatGameO); axis off; 239 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 230 image(oNewGameO); axis off; 231 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 232 image(oNewGameO); axis off; 233 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 234 image(oNewGameO); axis off; 235 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 236 image(oNewGameO); axis off; 237 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 238 image(oNewGameO); axis off; 239 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 231 image(oNewGameO); axis off; 239 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 231 image(oNewGameO); axis off; 239 set(dMenu, 'CurrentAxes', dMenuDatGameAxes); 231 im</pre>		
<pre>125 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 126 image(oNewGame0);axis off; 127 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 128 image(oCadGame1);axis off; 129 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 130 image(oOptions0);axis off; 131 set(dMenu,'CurrentAxes',dMenuExitAxes); 132 image(oOptions0);axis off; 133 set(dMenu,'CurrentAxes',dMenuExitAxes); 134 image(oNewGame0);axis off; 135 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 136 set(0,'CurrentAxes',dMenuCadGameAxes); 137 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 138 image(oNewGame0); axis off; 139 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 140 image(oDadGame0); axis off; 143 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 144 image(oCameHelp1); axis off; 145 set(dMenu,'CurrentAxes',dMenuCatAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentTigure',dMenu); 148 set(0,'CurrentAxes',dMenuCadGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 152 image(oNewGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 154 image(oNewGame0); axis off; 155 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 156 image(oNewGame0); axis off; 157 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 158 image(oNewGame0); axis off; 159 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 152 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 153 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 154 image(oDatons1); axis off; 155 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 166 image(oLadGame0); axis off; 167 set(dMenu,'CurrentAxes',dMenuLaadGameAxes); 168 image(oLadGame0); axis off; 169 set(dMenu,'CurrentAxes',dMenuLaadGameAxes); 161 set(dMenu,'CurrentAxes',dMenuLaadGameAxes); 162 image(oLadGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLaadGameAxes); 164 image(oLadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuLaadGameAxes); 166 image(oLadGame0); axis off; 167 set(dMenu,'CurrentAxes',dMenuLaadGameAxes); 168 image(OLadGame0); axis off; 169 set(dMenu,'CurrentAxes',</pre>	123	elseif kPosition == 2
<pre>126 image (oNewGame0); xxis off; 127 set (dMenu, 'CurrentAxes', dMenuGameHelpAxes); 128 image (oGameHelp0); axis off; 129 set(dMenu, 'CurrentAxes', dMenuOptionsAxes); 130 image (oGameHelp0); axis off; 131 set(dMenu, 'CurrentAxes', dMenuOptionsAxes); 132 image (oExit0); axis off; 133 image (oExit0); axis off; 134 elself kPosition == 3 135 set(dMenu, 'CurrentAxes', dMenuLoadGameAxes); 136 set(0, 'CurrentAxes', dMenuLoadGameAxes); 137 set(dMenu, 'CurrentAxes', dMenuLoadGameAxes); 138 image (oLadGame0); axis off; 139 set(dMenu, 'CurrentAxes', dMenuLoadGameAxes); 140 image (oLadGame0); axis off; 141 set(dMenu, 'CurrentAxes', dMenuLoadGameAxes); 142 image (oGameHelp1); axis off; 143 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 144 image (oCptions0); axis off; 145 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 146 image (oCptions0); axis off; 147 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 150 image (oLadGame0); axis off; 151 set(dMenu, 'CurrentAxes', dMenuDexGameAxes); 152 image (oLadGame0); axis off; 153 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 154 image (oCameHelp0); axis off; 155 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 156 image (oCoptions1); axis off; 157 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 158 image (oCoptions1); axis off; 159 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 150 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 151 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 152 image (oDavGame0); axis off; 153 set(dMenu, 'CurrentAxes', dMenuDeptionsAxes); 154 image (oDavGame0); axis off; 155 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 166 image (oDavGame0); axis off; 167 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 168 image (oCoadGame0); axis off; 169 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 160 image (oCoadGame0); axis off; 161 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 162 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 163 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 164 image (oCoadGame0); axis off; 175 set(dMenu, 'CurrentAxes', dMenuDeadGameAxes); 176 image (oCoadGame0); a</pre>	124	<pre>set(0,'CurrentFigure',dMenu);</pre>
<pre>127 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 128 image(oLadGamel);axis off; 129 set(dMenu,'CurrentAxes',dMenuQameHelpAxes); 130 image(oQameHelpQ); axis off; 131 set(dMenu,'CurrentAxes',dMenuExitAxes); 132 image(oExitO); axis off; 133 set(dMenu,'CurrentAxes',dMenuExitAxes); 134 image(oLadGameQ); axis off; 135 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 136 image(oNewGameQ); axis off; 137 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 138 image(oLadGameQ); axis off; 139 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 140 image(oLadGameQ); axis off; 141 set(dMenu,'CurrentAxes',dMenuCatGameAxes); 142 image(oCameHelp1); axis off; 143 set(dMenu,'CurrentAxes',dMenuCatGameAxes); 144 image(oOptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 146 image(oExitO); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 150 image(oLadGameQ); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLadGameQ); axis off; 153 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 154 image(oCadGameQ); axis off; 155 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 156 image(oCadGameQ); axis off; 157 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 158 image(oCatiO); axis off; 159 set(dMenu,'CurrentAxes',dMenuDotionsAxes); 150 image(oCatiO); axis off; 151 set(dMenu,'CurrentAxes',dMenuDotionsAxes); 152 image(oCatiO); axis off; 153 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 154 image(oCatiO); axis off; 155 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 156 image(oCatiO); axis off; 157 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 161 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 162 image(oLadGameQ); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLadGameQ); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oLadGameQ); axis off; 167 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 168 image(oLadGameQ); axis off; 169 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 160 image(oLadGameQ); axis off; 161 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 162 image(OLadGameQ); axis off; 163 set(dMenu,'C</pre>	125	<pre>set(dMenu,'CurrentAxes',dMenuNewGameAxes);</pre>
<pre>128 image(oLoadGamel);axis off; 129 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 130 image(oGameHelpQ); axis off; 131 set(dMenu,'CurrentAxes',dMenuExitAxes); 132 image(oDetionsO); axis off; 133 set(dMenu,'CurrentAxes',dMenuExitAxes); 134 image(oLoadGameO); axis off; 135 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 136 set(O,'CurrentAxes',dMenuLoadGameAxes); 137 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 138 image(oLoadGameO); axis off; 139 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 140 image(oLoadGameO); axis off; 141 set(dMenu,'CurrentAxes',dMenuCoatGameAxes); 142 image(oOptionsO); axis off; 143 set(dMenu,'CurrentAxes',dMenuExitAxes); 144 image(oOptionsO); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExitO); axis off; 147 elseif kPosition == 4 148 set(O,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 150 image(oLoadGameO); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 154 image(oExitO); axis off; 155 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 156 image(oCameHelpO); axis off; 157 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 158 image(oCameHelpO); axis off; 159 set(dMenu,'CurrentAxes',dMenuExitAxes); 150 image(oCameHelpO); axis off; 151 set(dMenu,'CurrentAxes',dMenuExitAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuExitAxes); 154 image(oLoadGameO); axis off; 155 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 156 image(oLoadGameO); axis off; 157 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oCameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuExitAxes); 168 image(oCameHelpO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 160 image(oExitI); axis off; 171 else 172 end</pre>	126	<pre>image(oNewGame0);axis off;</pre>
<pre>128 image(oLoadGamel);axis off; 129 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 130 image(oGameHelpQ); axis off; 131 set(dMenu,'CurrentAxes',dMenuExitAxes); 132 image(oDetionsO); axis off; 133 set(dMenu,'CurrentAxes',dMenuExitAxes); 134 image(oLoadGameO); axis off; 135 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 136 set(O,'CurrentAxes',dMenuLoadGameAxes); 137 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 138 image(oLoadGameO); axis off; 139 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 140 image(oLoadGameO); axis off; 141 set(dMenu,'CurrentAxes',dMenuCoatGameAxes); 142 image(oOptionsO); axis off; 143 set(dMenu,'CurrentAxes',dMenuExitAxes); 144 image(oOptionsO); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExitO); axis off; 147 elseif kPosition == 4 148 set(O,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 150 image(oLoadGameO); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 154 image(oExitO); axis off; 155 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 156 image(oCameHelpO); axis off; 157 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 158 image(oCameHelpO); axis off; 159 set(dMenu,'CurrentAxes',dMenuExitAxes); 150 image(oCameHelpO); axis off; 151 set(dMenu,'CurrentAxes',dMenuExitAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuExitAxes); 154 image(oLoadGameO); axis off; 155 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 156 image(oLoadGameO); axis off; 157 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oCameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuExitAxes); 168 image(oCameHelpO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 160 image(oExitI); axis off; 171 else 172 end</pre>	127	<pre>set(dMenu, 'CurrentAxes', dMenuLoadGameAxes);</pre>
<pre>129 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 130 image(oCameHelpO); axis off; 131 image(oOptionsO); axis off; 132 image(oOptionsO); axis off; 133 set(dMenu,'CurrentAxes',dMenuExitAxes); 134 image(oCaxiO); axis off; 135 elseif kPosition == 3 136 set(0,'CurrentFigure',dMenu); 137 set(dMenu,'CurrentAxes',dMenuGameAxes); 138 image(oLoadGameO); axis off; 139 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 140 image(oCaxiO); axis off; 141 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 142 image(oCameHelpI); axis off; 143 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 144 image(oCaxiO); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExitO); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 150 image(oCaxeel,dMenuO; axis off; 151 set(dMenu,'CurrentAxes',dMenuGameAxes); 150 image(oCaxeel,dMenuO; axis off; 153 set(dMenu,'CurrentAxes',dMenuGameAxes); 154 image(oCameHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuGameAxes); 156 image(oCameHelpO); axis off; 157 set(dMenu,'CurrentAxes',dMenuGameAxes); 158 image(oCameHelpO); axis off; 159 set(dMenu,'CurrentAxes',dMenuGameAxes); 150 image(oCameHelpO); axis off; 151 set(dMenu,'CurrentAxes',dMenuGameAxes); 152 image(oCaxeHelpO); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameAxes); 154 image(oCaxeHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuExitAxes); 166 image(oCaxeHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuExitAxes); 168 image(oCaxed); axis off; 169 set(dMenu,'CurrentAxes',dMenuGameAxes); 161 image(oCaxeHelpO); axis off; 162 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 163 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 164 image(oCaxeHelpO); axis off; 165 set(dMenu,'CurrentAxes',dMenuDoptionsAxes); 166 image(oCaxeHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuExitAxes); 168 image(oExitI); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 160 image(oExitI); axis off; 170 image(oExitI); axis off; 171 else 172 end</pre>	128	
<pre>130 image(oGameHelp0); axis off; 131 set(dMenu, 'CurrentAxes', dMenuOptionsAxes); 132 image(coExitO); axis off; 133 image(coExitO); axis off; 135 elseif kPosition == 3 136 set(0, 'CurrentFigure', dMenu); 137 set(dMenu, 'CurrentAxes', dMenuNewGameAxes); 138 image(coExitO); axis off; 139 set(dMenu, 'CurrentAxes', dMenuCadGameAxes); 140 image(coEadGameO); axis off; 141 set(dMenu, 'CurrentAxes', dMenuCameHelpAxes); 142 image(coExitO); axis off; 143 set(dMenu, 'CurrentAxes', dMenuCameHelpAxes); 144 image(coExitO); axis off; 145 set(dMenu, 'CurrentAxes', dMenuCattAxes); 146 image(coExitO); axis off; 147 elseif kPosition == 4 148 set(0, 'CurrentFigure', dMenu); 149 set(dMenu, 'CurrentAxes', dMenuCattAxes); 150 image(coExitO); axis off; 151 set(dMenu, 'CurrentAxes', dMenuCattAxes); 152 image(coExitO); axis off; 153 set(dMenu, 'CurrentAxes', dMenuCattAxes); 154 image(coExitO); axis off; 155 set(dMenu, 'CurrentAxes', dMenuCattAxes); 156 image(coExitO); axis off; 157 set(dMenu, 'CurrentAxes', dMenuCattAxes); 158 image(coExitO); axis off; 159 elseif kPosition == 5 159 set(dMenu, 'CurrentAxes', dMenuCattAxes); 150 image(coExitO); axis off; 151 set(dMenu, 'CurrentAxes', dMenuCattAxes); 152 image(coExitO); axis off; 153 set(dMenu, 'CurrentAxes', dMenuCattAxes); 154 image(coExitO); axis off; 155 set(cMenu, 'CurrentAxes', dMenuLattAxes); 156 image(coExitO); axis off; 157 set(dMenu, 'CurrentAxes', dMenuLattAxes); 158 image(coExitO); axis off; 159 set(cMenu, 'CurrentAxes', dMenuLattAxes); 160 set(cMenu, 'CurrentAxes', dMenuLattAxes); 161 set(cMenu, 'CurrentAxes', dMenuLattAxes); 162 image(coExitO); axis off; 163 set(cMenu, 'CurrentAxes', dMenuLattAxes); 164 image(coExitO); axis off; 165 set(cMenu, 'CurrentAxes', dMenuLattAxes); 166 image(coExitO); axis off; 167 set(cMenu, 'CurrentAxes', dMenuCattAxes); 168 image(coExitO); axis off; 169 set(cMenu, 'CurrentAxes', dMenuCattAxes); 160 image(coExitO); axis off; 161 set(cMenu, 'CurrentAxes', dMenuCattAxes); 162 image(coExitO); axis off; 173 else 174 else</pre>		
<pre>111 112 1132 1133 1134 1135 1135 1136 1137 1137 1138 1139 1139 1139 1139 1139 1139 1139</pre>		
<pre>132 133 134 135 135 136 137 137 136 137 137 138 138 139 139 139 139 139 139 139 139 139 139</pre>		
<pre>133 134 135 135 135 135 135 135 136 137 137 137 137 137 137 138 138 139 139 139 139 139 139 139 139 139 139</pre>		
<pre>image (oExit0); axis off; set (d, 'CurrentFigure', dMenu); set (d, 'CurrentFigure', dMenuNewGameAxes); image (oNewGame0); axis off; set (dMenu, 'CurrentAxes', dMenuCoadGameAxes); image (oLoadGame0); axis off; set (dMenu, 'CurrentAxes', dMenuGameHelpAxes); image (oCameHelp1); axis off; set (dMenu, 'CurrentAxes', dMenuOptionsAxes); image (oCameHelp1); axis off; set (dMenu, 'CurrentAxes', dMenuExitAxes); image (oExit0); axis off; set (dMenu, 'CurrentAxes', dMenuNewGameAxes); image (oExit0); axis off; set (dMenu, 'CurrentAxes', dMenuNewGameAxes); image (oNewGame0); axis off; set (dMenu, 'CurrentAxes', dMenuLoadGameAxes); image (oLoadGame0); axis off; set (dMenu, 'CurrentAxes', dMenuGameAxes); image (oLoadGame0); axis off; set (dMenu, 'CurrentAxes', dMenuGameHelpAxes); image (oLoadGame0); axis off; set (dMenu, 'CurrentAxes', dMenuDionsAxes); image (oCameHelp0); axis off; set (dMenu, 'CurrentAxes', dMenuDionsAxes); image (oCptions1); axis off; set (dMenu, 'CurrentAxes', dMenuDataxes); image (oCptions1); axis off; set (dMenu, 'CurrentAxes', dMenuDataxes); image (oCptions1); axis off; set (dMenu, 'CurrentAxes', dMenuLoadGameAxes); image (oNewGame0); axis off; set (dMenu, 'CurrentAxes', dMenuLoadGameAxes); image (oNewGame0); axis off; set (dMenu, 'CurrentAxes', dMenuLoadGameAxes); image (oCameHelp0); axis off; set (dMenu, 'CurrentAxes', dMenuLoadGameAxes); image (oCameHelp0); axis off; set (dMenu, 'CurrentAxes', dMenuDataxes); image (oCameHelp0); axi</pre>		
<pre>135 elseif kPosition == 3 136 set(0, 'CurrentFigure',dMenu); 137 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 138 image(oLoadGame0); axis off; 139 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 140 image(oCameHelp1); axis off; 141 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 142 image(oExit0); axis off; 143 set(dMenu,'CurrentAxes',dMenuExitAxes); 144 image(oExit0); axis off; 145 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenuLoadGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 154 image(oCameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuExitAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oCameHelp0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenuExitAxes); 158 image(oCameO); axis off; 159 set(dMenu,'CurrentAxes',dMenuExitAxes); 150 image(oDetions1); axis off; 151 set(dMenu,'CurrentAxes',dMenuExitAxes); 152 image(oDetions1); axis off; 153 set(dMenu,'CurrentAxes',dMenuExitAxes); 154 image(oCameO); axis off; 155 set(dMenu,'CurrentAxes',dMenuExitAxes); 156 image(oDetionS); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oCameO); axis off; 159 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 161 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 162 image(oCameO); axis off; 163 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 164 image(oCameHelpO); axis off; 165 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 166 image(oCameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 168 image(oCameHelpO); axis off; 169 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 160 image(oCameHelpO); axis off; 161 image(oCameHelpO); axis off; 162 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 163 image(oCameHelpO); axis off; 164 image(oCameHelpO); axis off; 175 set(dMenu,'CurrentAxes',dMenuDadGameAxes); 176 image(oCameHelpO); axis off; 177 set(dMenu,'CurrentAxes',dMenuDadGa</pre>		
<pre>136 set(0,'CurrentFigure',dMenu); 137 set(dMenu,'CurrentAxee',dMenuNewGameAxes); 138 image(oNewGame0); axis off; 139 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 140 image(oLoadGame0); axis off; 141 set(dMenu,'CurrentAxes',dMenuQameHelpAxes); 142 image(oGameHelp1); axis off; 143 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 144 image(oOptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 150 image(oLoadGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuQptionsAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(options1); axis off; 157 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 162 image(oExit0); axis off; 163 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 164 image(oCadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 166 image(oCadGame0); axis off; 167 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 168 image(oCadGame0); axis off; 169 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 160 image(oCatfill); axis off; 161 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 162 image(oCatfill); axis off; 163 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 164 image(oCatfill); axis off; 165 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 176 image(oExit1); axis off; 177 set(dMenu,'CurrentAxes',dMenuDatdGameAxes); 178 image(oExit1); axis off; 179 else</pre>		-
<pre>137 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 138 image(oNewGame0); axis off; 139 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 140 image(oCadGame0); axis off; 141 set(dMenu,'CurrentAxes',dMenuQameHelpAxes); 142 image(oGameHelp1); axis off; 143 set(dMenu,'CurrentAxes',dMenuDtionsAxes); 144 image(oOptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 152 image(oLadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 156 image(oDptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 162 image(oDptions1); axis off; 163 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 164 image(oLadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 166 image(oDptions1); axis off; 167 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 168 image(oDadGame0); axis off; 169 elseif kPosition == 5 160 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 161 image(oCadGame0); axis off; 162 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 163 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 164 image(oCadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 166 image(oDptions0); axis off; 167 set(dMenu,'CurrentAxes',dMenuCatAxes); 168 image(oDptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>138 image(oNewGame0); axis off; 139 set(dMenu,'CurrentAxee',dMenuLoadGameAxes); 140 image(oLoadGame0); axis off; 141 set(dMenu,'CurrentAxee',dMenuQameHelpAxes); 142 image(oGameHelp1); axis off; 143 set(dMenu,'CurrentAxee',dMenuDptionsAxes); 144 image(options0); axis off; 145 set(dMenu,'CurrentAxee',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxee',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 162 image(oLoadGameO); axis off; 163 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 166 image(oOptions1); axis off; 167 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 168 image(oLoadGameO); axis off; 169 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 160 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 161 image(oCadGameO); axis off; 162 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 163 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 164 image(oCadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 166 image(oCadGameO); axis off; 167 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 168 image(oCadGameO); axis off; 169 set(dMenu,'CurrentAxes',dMenuCatAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>139 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 140 image(oLoadGameO); axis off; 141 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 142 image(oQameHelp1); axis off; 143 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 144 image(oDtionsO); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExitO); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGameO); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuDoptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExitO); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 162 image(oLoadGameO); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oLoadGameO); axis off; 167 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 168 image(oLoadGameO); axis off; 169 set(dMenu,'CurrentAxes',dMenuGameAxes); 164 image(oCameHelpO); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oCameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptionsO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExitI); axis off; 171 else 172 end</pre>		
<pre>140 image(oLoadGame0); axis off; 141 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 142 image(oGameHelp1); axis off; 143 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 144 image(oOptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuExitAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuExitAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameAxes); 166 image(oLoadGame0); axis off; 167 set(dMenu,'CurrentAxes',dMenuGameAxes); 168 image(oLoadGame0); axis off; 169 set(dMenu,'CurrentAxes',dMenuGameAxes); 160 image(oOptions0); axis off; 161 set(dMenu,'CurrentAxes',dMenuGameAxes); 162 image(oOptions0); axis off; 163 set(dMenu,'CurrentAxes',dMenuGameAxes); 164 image(oOptions0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameAxes); 166 image(oOptions0); axis off; 167 set(dMenu,'CurrentAxes',dMenuGameAxes); 168 image(oExit1); axis off; 170 else 172 end</pre>	138	<pre>image(oNewGame0); axis off;</pre>
<pre>141 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 142 image(oGameHelp1); axis off; 143 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 144 image(oOptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oLoadGame0); axis off; 167 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 168 image(oLoadGame0); axis off; 169 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oCameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuCptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuLoxitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>	139	<pre>set(dMenu,'CurrentAxes',dMenuLoadGameAxes);</pre>
<pre>142 image(oGameHelpl); axis off; 143 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 144 image(oOptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oCameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuSameAxes); 168 image(oCameHelp0); axis off; 169 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 160 image(oCameHelp0); axis off; 161 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 162 image(oCameHelp0); axis off; 163 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 164 image(oCameHelp0); axis off; 165 set(dMenu,'CurrentAxes',dMenuSameAxes); 166 image(oCameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuCameHelpAxes); 168 image(oCptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>	140	<pre>image(oLoadGame0); axis off;</pre>
<pre>142 image(oGameHelpl); axis off; 143 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 144 image(oDptionsO); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExitO); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 150 image(oNewGameO); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oDptionsI); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExitO); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 163 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 166 image(oCadGameO); axis off; 167 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 168 image(oCadGameO); axis off; 169 set(dMenu,'CurrentAxes',dMenuSewGameAxes); 160 set(dMenu,'CurrentAxes',dMenuSewGameAxes); 161 image(oCadGameO); axis off; 162 set(dMenu,'CurrentAxes',dMenuSewGameAxes); 163 set(dMenu,'CurrentAxes',dMenuSewGameAxes); 164 image(oCadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuSewSes); 168 image(oCameHelpO); axis off; 169 set(dMenu,'CurrentAxes',dMenuSexSes); 168 image(oSameHelpO); axis off; 169 set(dMenu,'CurrentAxes',dMenuSexSes); 170 image(oExitD); axis off; 171 else 172 end</pre>	141	<pre>set(dMenu,'CurrentAxes',dMenuGameHelpAxes);</pre>
<pre>143 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 144 image(oDptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 150 image(oLoadGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oLoadGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuCadGameAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuSameAxes); 168 image(oCameHelp0); axis off; 169 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 168 image(oDptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>	142	
<pre>144 image(oOptions0); axis off; 145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 162 image(oLoadGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuCameHelpAxes); 168 image(oCameHelp0); axis off; 169 set(dMenu,'CurrentAxes',dMenuCameHelpAxes); 160 image(oCameHelp0); axis off; 161 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 162 image(oCameHelp0); axis off; 163 set(dMenu,'CurrentAxes',dMenuExitAxes); 164 image(oCameHelp0); axis off; 165 set(dMenu,'CurrentAxes',dMenuCameHelpAxes); 166 image(oCameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuExitAxes); 168 image(oCptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>	143	
<pre>145 set(dMenu,'CurrentAxes',dMenuExitAxes); 146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oLoadGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuCoadGameAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuCoadGameAxes); 168 image(oGameHelp0); axis off; 169 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 160 image(oCadGame0); axis off; 161 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 162 image(oCameHelp0); axis off; 163 set(dMenu,'CurrentAxes',dMenuDitionsAxes); 164 image(oCameHelp0); axis off; 165 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 166 image(oCameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuExitAxes); 168 image(oPtions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oPtions0); axis off; 171 else 172 end</pre>		-
<pre>146 image(oExit0); axis off; 147 elseif kPosition == 4 148 set(0, 'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oDptionsl); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 168 image(oGameHelp0); axis off; 169 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 169 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>147 elseif kPosition == 4 148 set(0, 'CurrentFigure',dMenu); 149 set(dMenu, 'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu, 'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu, 'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu, 'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu, 'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0, 'CurrentFigure',dMenu); 161 set(dMenu, 'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu, 'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu, 'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu, 'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu, 'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>148 set(0,'CurrentFigure',dMenu); 149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGameO); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExitO); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGameO); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 166 image(oGameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptionsO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>149 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oDptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>150 image(oNewGame0); axis off; 151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuDptionsAxes); 156 image(oDptionsl); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>151 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 152 image(oLoadGameO); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExitO); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGameO); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptionsO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>152 image(oLoadGame0); axis off; 153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>153 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 154 image(oGameHelpO); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExitO); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGameO); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptionsO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>154 image(oGameHelp0); axis off; 155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>155 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>156 image(oOptions1); axis off; 157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>157 set(dMenu,'CurrentAxes',dMenuExitAxes); 158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>	155	<pre>set(dMenu,'CurrentAxes',dMenuOptionsAxes);</pre>
<pre>158 image(oExit0); axis off; 159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGame0); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>	156	<pre>image(oOptions1); axis off;</pre>
<pre>159 elseif kPosition == 5 160 set(0,'CurrentFigure',dMenu); 161 set(dMenu,'CurrentAxes',dMenuNewGameAxes); 162 image(oNewGameO); axis off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGameO); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptionsO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>	157	<pre>set(dMenu,'CurrentAxes',dMenuExitAxes);</pre>
<pre>160 161 161 162 162 163 163 163 164 165 164 165 165 165 165 166 166 166 167 167 167 168 168 168 168 169 169 169 169 169 169 169 169 160 169 169 160 169 160 160 160 160 160 160 160 160 160 160</pre>	158	<pre>image(oExit0); axis off;</pre>
<pre>161 162 162 162 163 163 164 165 164 165 165 165 165 166 166 166 167 167 168 168 168 168 169 169 169 169 169 169 169 169 160 169 160 169 160 169 160 160 160 160 160 160 160 160 160 160</pre>	159	elseif kPosition == 5
<pre>161 162 162 162 163 163 164 165 164 165 165 165 165 166 166 166 167 167 168 168 168 168 169 169 169 169 169 169 169 169 160 169 160 169 160 169 160 160 160 160 160 160 160 160 160 160</pre>	160	<pre>set(0, 'CurrentFigure', dMenu);</pre>
<pre>162 image(oNewGame0); axis_off; 163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>163 set(dMenu,'CurrentAxes',dMenuLoadGameAxes); 164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>164 image(oLoadGame0); axis off; 165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		-
<pre>165 set(dMenu,'CurrentAxes',dMenuGameHelpAxes); 166 image(oGameHelpO); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptionsO); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>166 image(oGameHelp0); axis off; 167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>167 set(dMenu,'CurrentAxes',dMenuOptionsAxes); 168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>168 image(oOptions0); axis off; 169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
<pre>169 set(dMenu,'CurrentAxes',dMenuExitAxes); 170 image(oExit1); axis off; 171 else 172 end</pre>		
170image(oExit1); axis off;171else172end		
171 else 172 end		
172 end		
173 end		end
	173	end

10



### **EXIT**

Fig. 6. Part of dialog with set of "buttons" as pictures

#### 8. Showing the vectors in dialogs

This part shows an example how to show vectors in dialog. There are several possibilities but this example seems to me as the simplest one. The realisation is provided in lines 174 to 251, and sample output is shown in figure 7. It is based on the following. The vectors of same length with numeric values change their data type using num2str function and they are added into one listbox in dialogue, each column for one data vector. And now the short description of provided source code is going to be outlined. Lines 174 and 175 predefine the name of colors to be used in the dialog, lines 176 - 180 defines new dialog, and lines 181 - 189 new menu and its items. The background of the dialog was created in Adobe Photoshop and the code for showing it in the dialog is in lines 190 - 192. There are several objects in the dialog. They are given by the code in lines 196 - 241. The position of objects depends on the screen resolution and therefore the  $k_y$  variable is used. The most important code for this example is in lines 242 - 251. The data are given via the String property, lines 250 and 251 have to be one line actually! The data type change is realized for the matrix, because each input in lines 250 and 251 is actually the vector.

```
174 cerna=[0 0 0];
175 cervena=[1 0 0];
176 hf6=figure('Color',cerna,...
177 'Name','Tabulka t, ul, yl, wl',...
178 'MenuBar','None',...
179 'Resize','off',...
```

```
'NumberTitle','off');
180
     hmenu4=uimenu('label','Zobrazit tabulku :');
hmenu42=uimenu(hmenu4,'label','t,u2,y2,w2',...
181
182
                      'CallBack', 'tu2y2w2');
183
     hmenu43=uimenu(hmenu4, 'label', 't, e1, e2', ...
184
185
         'CallBack', 'te1e2');
     hmenu44=uimenu(hmenu4, 'label', 't, T11, T21, K1', ...
186
         'CallBack','tT11T21K1');
187
188
     hmenu45=uimenu(hmenu4, 'label', 't, T12, T22, K2',...
        'CallBack', 'tT12T22K2');
189
190
       axes('Position',[0 0 1 1]);
191
      image(vysledky);
192
       axis off;
193
       close(hf10);
194
       dial7;
195
       pause(1);
196
       text17 = uicontrol(hf6,...
         'HorizontalAlignment', 'center',...
197
198
          'BackgroundColor', cerna,
         'ForegroundColor', cervena, ...
199
         'Units', 'points', ..
200
         'Position',[134 k_y*213.25 29.75 13.5], ...
201
202
         'Style', 'text', ...
203
         'String','t(s)');
204
       text18 = uicontrol(hf6,...
205
          'HorizontalAlignment', 'center',...
206
          'BackgroundColor', cerna, ...
207
          'ForegroundColor', cervena, ...
208
          'Units', 'points', ...
         'Position',[174 k_y*213.25 29.75 13.5], ...
209
         'Style','text',
210
        'String','u1');
211
212
       text19 = uicontrol(hf6,...
213
          'HorizontalAlignment', 'center',...
         'BackgroundColor', cerna, ...
214
         'ForegroundColor', cervena, ...
215
       'Units', 'points', ...
216
217
        'Position', [219 k_y*213.25 29.75 13.5],
         'Style', 'text', ...
218
219
        'String','y1');
220
       text20 = uicontrol(hf6,...
          'HorizontalAlignment', 'center', ...
221
222
          'BackgroundColor', cerna,
                                     . . .
223
          'ForegroundColor', cervena, ...
          'Units', 'points', ..
224
         'Position', [259 k_y*213.25 29.75 13.5], ...
225
         'Style', 'text',
226
                          . . .
227
         'String','w1');
       text24 = uicontrol(hf6,...
228
229
          'HorizontalAlignment', 'right', ...
230
         'BackgroundColor', cerna, ...
```

```
231
          'ForegroundColor', cervena, ...
232
          'Units', 'points', ...
233
         'Position',[130 k_y*109.25 264.75 k_y*121.5], ...
        'Style','frame');
234
235
       text24 = uicontrol(hf6,...
236
          'HorizontalAlignment', 'right',...
          'BackgroundColor', cerna, ...
237
          'ForegroundColor', cervena, ...
238
       'Units', 'points', ...
'Position',[130 k_y*109.25 264.75 k_y*101.5],
239
240
                                                            <del>...</del>
          'Style','frame');
241
242
      ddd=size(param1); d1=ddd(1,2);
243
      text24 = uicontrol(hf6,...
            'HorizontalAlignment', 'right', ...
244
245
            'BackgroundColor', cerna, ...
            'ForegroundColor', cervena, ...
246
            'Units', 'points', ...
247
           'Position', [134 k_y*113.25 256.75 k_y*93.5], ...
248
249
           'Style', 'listbox', ...
250
           'String',num2str([param1(:,d1) real(simout1(:,1))
251
       real(simout1(:,2)) real(simout1(:,3))]));
```

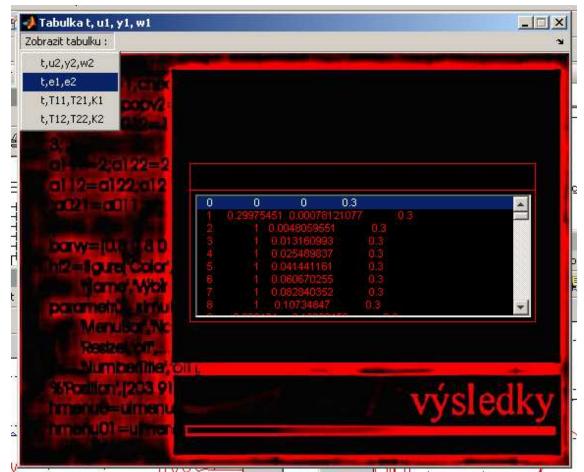


Fig. 7. Dialog with vectors, data, shown in table

#### 9. Nicely drawn results from Simulink

Simulink provides Scope block for drawing the results of simulation. It is a fast solution. If you want to manage the look of the graph, saving the data to Matlab Workspace and drawing them by the chosen plotting function is the easiest way. The following example shows it, lines 252 to 266 and figures 8 to 10.

252 253	close all clear all
254	clc
255	a=0.1; b=0.01; c=0.5;
256	<pre>sim('untitled1',[0 10])</pre>
257	t=v(:,1);
258	x=v(:,2);
259	Dx=v(:,3);
260	plot(t,x,'r')
261	hold on
262	<pre>plot(t,Dx,'k')</pre>
263	title('x and its derivation')
264	<pre>xlabel('time [t]')</pre>
265	ylabel('x(t), Dx(t)')
266	legend(' $x(t)$ ', ' $Dx(t)$ ')

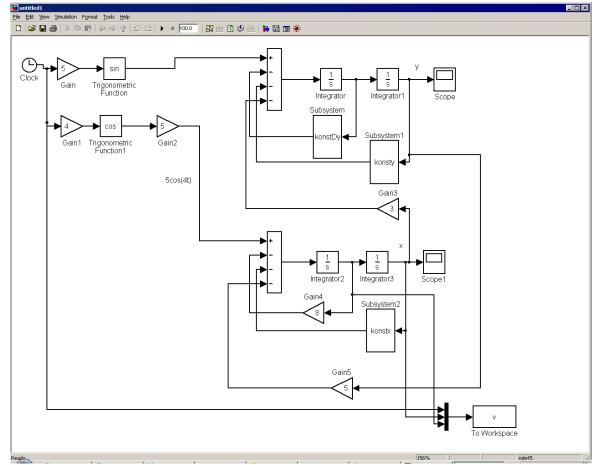


Fig. 8. Simulink model with Scope and To Workspace blocks

Sink Block Parameters: To Workspace         X           To Workspace         Write input to specified array or structure in MATLAB's main workspace. Data is not available until the simulation is stopped or paused.	
Parameters Variable name: y Limit data points to last: inf Decimation: 1 Sample time (-1 for inherited): [-1 Save format: Array ↓ Log fixed-point data as an fi object 0K Cancel Help Apply	) En

Fig. 9. Setting the parameters of Scope block

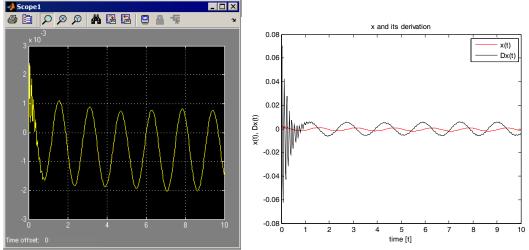


Fig. 10. Graphical output from Simulink (left) and using plot function (right)

Firstly, the Simulink model named as *untitled1.mdl* is created according to figure 8. To Workspace block saves the data into v variable as an array, see the settings in figure 9. Time is the first input to the To Workspace block. Simulation of the model is called by sim function, line 256. You can view the simulation results by clicking the blocks Scope and Scope1 in the model, see figure 10 - left part. Lines 257 - 266 are responsible for nice and easy-to-edit graphical output, right part of figure 10. The data are sent to variables in lines 257 - 259.

#### **10. Conclusion**

This chapter presented some tips and tricks for programming in Matlab which appeared to be useful during the classes and it might be useful mostly for students and beginners. Almost all of them are oriented on working with GUI, only one tip is used with Simulink, the most common Matlab enlargement. The reader should be familiar with the basics of Matlab programming.

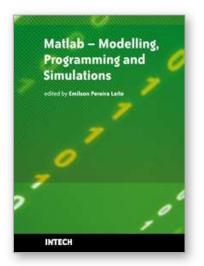
#### 11. Acknowledgement

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