Summer Fellowship Report

On

Porting Of eSim from PyQt V5 to V6

Submitted by

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Acknowledgment

Contents

Chapter 1

Introduction

1.1 eSim

eSim (previously known as Oscad / FreeEDA) is a free/libre and open-source EDA tool for circuit design, simulation, analysis, and PCB design. It is an integrated tool built using free/libre and open-source software such as KiCad, Ngspice, GHDL, OpenModelica, Verilator, Makerchip, and SkyWater SKY130 PDK. eSim is released under GNU General Public License.

eSim offers similar capabilities and ease of use as any equivalent proprietary software for schematic creation, simulation, and PCB design, without having to pay a huge amount of money to procure licenses. Hence it can be an affordable alternative to educational institutions and SMEs. It can serve as an alternative to commercially available/licensed software tools like OrCAD, PSpice, LTspice, Xpedition, and HSPICE.

1.2   Work Environment

Operating System : Ubuntu 21.04 (Focal Fossa)
Processor : Ryzen 7 4800hs
Ram : 16 GB
Other Software : Visual Studio Code, eSim, Git, Virtual-Box

1.3   Setup

1.3.1   Windows

Download the respective installation package from the official FOSSEE Website. After downloading, the setup file can be run to install eSim Desktop.

1.3.2   Ubuntu

Download the installation package from the official FOSSEE Website.After downloading follow these instructions to install along with Kicad.

Chapter 2

Porting of PyQt Version

2.1 API Changes

During the migration of our application from PyQt5 to PyQt6, several key API adjustments were made to ensure compatibility with the updated library version. These changes primarily revolved around import statements and method calls, reflecting modifications introduced in the PyQt6 API.

These API adaptations are essential steps in the migration process, ensuring that our codebase aligns with the changes and improvements introduced in PyQt6. The term "API changes" encapsulates these modifications, reflecting alterations to the application's programming interface to maintain compatibility with the newer PyQt version.

2.2 Changed Qtcore.Qt.Vertical to Qt.Orientation.Vertical

2.2.1 src/frontEnd/Application.py

```
@@ -37,7 +37,7 @@
    from frontEnd import ProjectExplorer
    from frontEnd import Workspace
    from frontEnd import DockArea
-   from PyQt5.QtCore import QSize
+   from PyQt6.QtCore import QSize,Qt
    import shutil
    import time
    import sys
@@ -244,7 +244,7 @@ def initToolBar(self):
            self.lefttoolbar.addAction(self.nghdl)
            self.lefttoolbar.addAction(self.omedit)
            self.lefttoolbar.addAction(self.omoptim)
-           self.lefttoolbar.setOrientation(QtCore.Qt.Vertical)
+           self.lefttoolbar.setOrientation(Qt.Orientation.Vertical)
            self.lefttoolbar.setIconSize(QSize(40, 40))


        def closeEvent(self, event):
@@ -883,7 +883,7 @@ def __init__(self, *args):
            self.obj_projectExplorer = ProjectExplorer.ProjectExplorer()

            # Adding content to vertical middle Split.
-           self.middleSplit.setOrientation(QtCore.Qt.Vertical)
+           self.middleSplit.setOrientation(Qt.Orientation.Vertical)
            self.middleSplit.addWidget(self.obj_dockarea)
            self.middleSplit.addWidget(self.noteArea)
```

2.2.2 src/frontEnd/Workspace.py

```
@@ -17,6 +17,7 @@

    from PyQt6 import QtCore, QtGui, QtWidgets
+   from PyQt6.QtCore import Qt
    from configuration.Appconfig import Appconfig
    import time
    import os
@@ -45,7 +46,7 @@ def initWorkspace(self):

        self.mainwindow = QtWidgets.QVBoxLayout()
        self.split = QtWidgets.QSplitter()
-       self.split.setOrientation(QtCore.Qt.Vertical)
+       self.split.setOrientation(Qt.Orientation.Vertical)

        self.grid = QtWidgets.QGridLayout()
        self.note = QtWidgets.QTextEdit(self)
```

2.2.3 src/modelEditor/ModelEditor.py

```
@@ -1,4 +1,5 @@
    from PyQt6 import QtWidgets, QtCore
+   from PyQt6.QtCore import Qt
    from PyQt6.QtWidgets import QTableWidgetItem
    import xml.etree.ElementTree as ET
    from configuration.Appconfig import Appconfig
@@ -41,7 +42,7 @@ def __init__(self):
        self.layout = QtWidgets.QVBoxLayout()
        self.splitter = QtWidgets.QSplitter()
        self.grid = QtWidgets.QGridLayout()
-       self.splitter.setOrientation(QtCore.Qt.Vertical)
+       self.splitter.setOrientation(Qt.Orientation.Vertical)

        # Initialise the table view
        self.modeltable = QtWidgets.QTableWidget()
```

2.2.4 src/subcircuit/Subcircuit.py

```
    @@ -1,4 +1,5 @@
    from PyQt6 import QtCore, QtWidgets
+   from PyQt6.QtCore import Qt
    from configuration.Appconfig import Appconfig
    from projManagement.Validation import Validation
    from subcircuit.newSub import NewSub
    @@ -27,7 +28,7 @@ def __init__(self, parent=None):
        self.obj_dockarea = parent
        self.layout = QtWidgets.QVBoxLayout()
        self.splitter = QtWidgets.QSplitter()
-       self.splitter.setOrientation(QtCore.Qt.Vertical)
+       self.splitter.setOrientation(Qt.Orientation.Vertical)

        self.newbtn = QtWidgets.QPushButton('New Subcircuit Schematic')
        self.newbtn.setToolTip('<b>To create new Subcircuit Schematic</
            b>')
```

2.3 replaced instances of self.msg.exec_ to self.msg.exec

```
-    self.msg.exec_()
+    self.msg.exec()
```

2.3.1 List of files with changes

1) src/frontEnd/Application.py (13 instances)
2) src/kicadtoNgspice/Convert.py (1 instance)
3) src/kicadtoNgspice/KicadtoNgspice.py (2 instances)
4) src/kicadtoNgspice/SubcircuitTab.py (4 instances)
5) src/maker/Maker.py (9 instances)
6) src/modelEditor/ModelEditor.py (2 instances)
7) src/ngspiceSimulation/pythonPlotting.py (2 instances)
8) src/ngspicetoModelica/ModelicaUI.py (2 instances)
9) src/projManagement/Kicad.py (5 instances)
10) src/projManagement/newProject.py (4 instances)
11) src/subcircuit/convertSub.py (2 instances)
12) src/subcircuit/newSub.py (4 instances)
13) src/subcircuit/uploadSub.py (5 instances)
14) src/frontEnd/ProjectExplorer.py (9 instances)
15) src/projManagement/Worker.py (1 instance)
16) src/subcircuit/Subcircuit.py (1 instance)

2.4 Changed all QMessageBoxes to follow PyQt6 Syntax

2.4.1 src/frontEnd/Application.py

```
@@ -268,11 +268,11 @@ def closeEvent(self, event):
        exit_msg = "Are you sure you want to exit the program?"
        exit_msg += " All unsaved data will be lost."
        reply = QtWidgets.QMessageBox.question(
-           self, 'Message', exit_msg, QtWidgets.QMessageBox.Yes,
-           QtWidgets.QMessageBox.No
+           self, 'Message', exit_msg, QtWidgets.QMessageBox.StandardButton.Yes,
+           QtWidgets.QMessageBox.StandardButton.No
        )

-       if reply == QtWidgets.QMessageBox.Yes:
+       if reply == QtWidgets.QMessageBox.StandardButton.Yes:
            for proc in self.obj_appconfig.procThread_list:
                try:
                    proc.terminate()
@@ -296,7 +296,7 @@ def closeEvent(self, event):
            event.accept()
            self.systemTrayIcon.showMessage('Exit', 'eSim is Closed.')

-       elif reply == QtWidgets.QMessageBox.No:
+       elif reply == QtWidgets.QMessageBox.StandardButton.No:
            event.ignore()
```

2.4.2 src/kicadtoNgspice/KicadtoNgspice.py

```
@@ -772,7 +772,7 @@ def callConvert(self):
            self.msg = "The KiCad to Ngspice conversion completed "
            self.msg += "successfully!"
            QtWidgets.QMessageBox.information(
-               self, "Information", self.msg, QtWidgets.QMessageBox.Ok
+               self, "Information", self.msg, QtWidgets.QMessageBox.StandardButton.Ok
            )
        except Exception as e:
            print("Exception Message: ", e)
```

2.4.3   src/maker/Maker.py

```
@@ -56,10 +56,10 @@ def makerchipTOSAccepted(display=True):
                    https://www.makerchip.com/terms/</a>). \
                    Have you read and do you \
                    accept these Terms of Service?",
-               QtWidgets.QMessageBox.Yes | QtWidgets.QMessageBox.No
+               QtWidgets.QMessageBox.StandardButton.Yes | QtWidgets.
   QMessageBox.StandardButton.No
            )

-        if reply == QtWidgets.QMessageBox.Yes:
+        if reply == QtWidgets.QMessageBox.StandardButton.Yes:
            f = open(home + "/.makerchip_accepted", "w")
            f.close()
            return True
@@ -116,17 +116,17 @@ def addverilog(self):
            "Error Message",
            "<b>No Verilog File Chosen. \
            Please choose a verilog file.</b>",
-               QtWidgets.QMessageBox.Ok | QtWidgets.QMessageBox.Cancel)
+               QtWidgets.QMessageBox.StandardButton.Ok | QtWidgets.
   QMessageBox.StandardButton.Cancel)

-        if reply == QtWidgets.QMessageBox.Ok:
+        if reply == QtWidgets.QMessageBox.StandardButton.Ok:
            self.addverilog()

            if self.verilogfile == "":
                return

            self.obj_Appconfig.print_info('Add Verilog File Called')

-        elif reply == QtWidgets.QMessageBox.Cancel:
+        elif reply == QtWidgets.QMessageBox.StandardButton.Cancel:
            self.obj_Appconfig.print_info('No Verilog File Chosen')
            return

@@ -228,12 +228,12 @@ def runmakerchip(self):
                To not open Makerchip IDE, click on CANCEL button. </b>\
                <br><br> NOTE: Makerchip IDE requires an active \
                internet connection and a browser.",
-               QtWidgets.QMessageBox.Yes
-               | QtWidgets.QMessageBox.No
-               | QtWidgets.QMessageBox.Cancel)
-           if reply == QtWidgets.QMessageBox.Cancel:
+               QtWidgets.QMessageBox.StandardButton.Yes
+               | QtWidgets.QMessageBox.StandardButton.No
+               | QtWidgets.QMessageBox.StandardButton.Cancel)
```

```
+            if reply == QtWidgets.QMessageBox.StandardButton.Cancel:
                 return
-            if reply == QtWidgets.QMessageBox.Yes:
+            if reply == QtWidgets.QMessageBox.StandardButton.Yes:
                 code = open(self.verilogfile).read()
                 text = code
                 filename = '.'.join(
@@ -277,7 +277,7 @@ def runmakerchip(self):
                     "<b>Error: File name and module \
                     name are not same. Please \
                     ensure that they are same.</b>",
-                    QtWidgets.QMessageBox.Ok)
+                    QtWidgets.QMessageBox.StandardButton.Ok)

                 self.obj_Appconfig.print_info(
                     'NgVeri stopped due to file \
```

2.4.4 src/maker/Maker.py

```
-            QtWidgets.QMessageBox.Yes | QtWidgets.QMessageBox.No
+            QtWidgets.QMessageBox.StandardButton.Yes | QtWidgets.
   QMessageBox.StandardButton.No)

-        if reply == QtWidgets.QMessageBox.Yes:
+        if reply == QtWidgets.QMessageBox.StandardButton.Yes:
             f = open(home + "/.makerchip_accepted", "w")
             f.close()
             return True
@@ -116,17 +116,17 @@ def addverilog(self):
             "Error Message",
             "<b>No Verilog File Chosen. \
         Please choose a verilog file.</b>",
-        QtWidgets.QMessageBox.Ok | QtWidgets.QMessageBox.Cancel)
+        QtWidgets.QMessageBox.StandardButton.Ok|QtWidgets.QMessageBox.
   StandardButton.Cancel)

-        if reply == QtWidgets.QMessageBox.Ok:
+        if reply == QtWidgets.QMessageBox.StandardButton.Ok:
             self.addverilog()

             if self.verilogfile == "":
                 return

             self.obj_Appconfig.print_info('Add Verilog File Called')

-        elif reply == QtWidgets.QMessageBox.Cancel:
+        elif reply == QtWidgets.QMessageBox.StandardButton.Cancel:
```

```
                  self.obj_Appconfig.print_info('No Verilog File Chosen')
                  return

@@ -228,12 +228,12 @@ def runmakerchip(self):
                    To not open Makerchip IDE, click on CANCEL button. </b>\
                    <br><br> NOTE: Makerchip IDE requires an active \
                    internet connection and a browser.",
-                    QtWidgets.QMessageBox.Yes
-                    | QtWidgets.QMessageBox.No
-                    | QtWidgets.QMessageBox.Cancel)
-            if reply == QtWidgets.QMessageBox.Cancel:
+                    QtWidgets.QMessageBox.StandardButton.Yes
+                    | QtWidgets.QMessageBox.StandardButton.No
+                    | QtWidgets.QMessageBox.StandardButton.Cancel)
+            if reply == QtWidgets.QMessageBox.StandardButton.Cancel:
                  return
-            if reply == QtWidgets.QMessageBox.Yes:
+            if reply == QtWidgets.QMessageBox.StandardButton.Yes:
                  code = open(self.verilogfile).read()
                  text = code
                  filename = '.'.join(
@@ -277,7 +277,7 @@ def runmakerchip(self):
                        "<b>Error: File name and module \
                        name are not same. Please \
                        ensure that they are same.</b>",
-                        QtWidgets.QMessageBox.Ok)
+                        QtWidgets.QMessageBox.StandardButton.Ok)

                  self.obj_Appconfig.print_info(
                        'NgVeri stopped due to file \
```

2.4.5   src/maker/ModelGeneration.py

```
@@ -204,7 +204,7 @@ def verilogParse(self):
            "Error Message",
            "<b>Error: File name and module \
            name are not same. Please ensure that they are same</b>",
-            QtWidgets.QMessageBox.Ok)
+            QtWidgets.QMessageBox.StandardButton.Ok)

        self.obj_Appconfig.print_info(
            'NgVeri stopped due to file \
@@ -1026,18 +1026,18 @@ def addfile(self):
        reply = QtWidgets.QMessageBox.critical(
            None, "Error Message",
            "<b>Error: No File Chosen. Please chose a file</b>",
```

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```diff
-                QtWidgets.QMessageBox.Ok | QtWidgets.QMessageBox.Cancel
+                QtWidgets.QMessageBox.StandardButton.Ok | QtWidgets.
    QMessageBox.StandardButton.Cancel
             )

-            if reply == QtWidgets.QMessageBox.Ok:
+            if reply == QtWidgets.QMessageBox.StandardButton.Ok:
                self.addfile()

                if includefile == "":
                    return

                self.obj_Appconfig.print_info('Add Other Files Called')

-            elif reply == QtWidgets.QMessageBox.Cancel:
+            elif reply == QtWidgets.QMessageBox.StandardButton.Cancel:
                self.obj_Appconfig.print_info('No File Chosen')
                return
```

```diff
@@ -1075,18 +1075,18 @@ def addfolder(self):
             reply = QtWidgets.QMessageBox.critical(
                None, "Error Message",
                "<b>Error: No Folder Chosen. Please chose a folder</b>",
-                QtWidgets.QMessageBox.Ok | QtWidgets.QMessageBox.Cancel
+                QtWidgets.QMessageBox.StandardButton.Ok | QtWidgets.
    QMessageBox.StandardButton.Cancel
             )

-            if reply == QtWidgets.QMessageBox.Ok:
+            if reply == QtWidgets.QMessageBox.StandardButton.Ok:
                self.addfolder()

                if includefolder == "":
                    return

                self.obj_Appconfig.print_info('Add Folder Called')

-            elif reply == QtWidgets.QMessageBox.Cancel:
+            elif reply == QtWidgets.QMessageBox.StandardButton.Cancel:
                self.obj_Appconfig.print_info('No Folder Chosen')
                return
```

```diff
@@ -1099,12 +1099,12 @@ def addfolder(self):
             of the folder to be added press "Yes".\
                If you want complete folder \
                to be added, press "No". </b>''',
-            QtWidgets.QMessageBox.Yes | QtWidgets.QMessageBox.No
```

```diff
+           QtWidgets.QMessageBox.StandardButton.Yes | QtWidgets.
   QMessageBox.StandardButton.No
         )
-        if reply == QtWidgets.QMessageBox.Yes:
+        if reply == QtWidgets.QMessageBox.StandardButton.Yes:
             self.cmd = "cp -a " + includefolder + "/. " + self.modelpath
             self.obj_Appconfig.print_info('Adding Contents of the Folder')
-        elif reply == QtWidgets.QMessageBox.No:
+        elif reply == QtWidgets.QMessageBox.StandardButton.No:
             self.cmd = "cp -R " + includefolder + " " + self.modelpath
             self.obj_Appconfig.print_info('Adding the Folder')
```

```diff
@@ -1196,13 +1196,13 @@ def readAllStandard(self):
         #      reply=QtWidgets.QMessageBox.critical(
         #              None, "Error Message",
         #              "<b>Error: No File Chosen. Please chose a file</b>",
-        #              QtWidgets.QMessageBox.Ok | QtWidgets.QMessageBox.
   Cancel
+        #              QtWidgets.QMessageBox.StandardButton.Ok | QtWidgets.
   QMessageBox.StandardButton.Cancel
         #          )
-        #      if reply == QtWidgets.QMessageBox.Ok:
+        #      if reply == QtWidgets.QMessageBox.StandardButton.Ok:
         #          self.addfile()
         #          self.obj_Appconfig.print_info('Add Other Files Called')

-        #      elif reply == QtWidgets.QMessageBox.Cancel:
+        #      elif reply == QtWidgets.QMessageBox.StandardButton.Cancel:
         #          self.obj_Appconfig.print_info('No File Chosen')
         # filename = os.path.basename(includefile)
         # self.modelpath=self.digital_home+"/"+self.fname.split('.')[0]+"/"
```

2.4.6 src/maker/NgVeri.py

```diff
@@ -89,8 +89,8 @@ def addverilog(self):
             "Error Message",
             "<b>Error: No Verilog File Chosen. \
             Please choose a verilog file in Makerchip Tab</b>",
-            QtWidgets.QMessageBox.Ok)
-        if reply == QtWidgets.QMessageBox.Ok:
+            QtWidgets.QMessageBox.StandardButton.Ok)
+        if reply == QtWidgets.QMessageBox.StandardButton.Ok:
             self.obj_Appconfig.print_error(
                 'No Verilog File Chosen. '
                 'Please choose a verilog file in Makerchip Tab'
@@ -109,7 +109,7 @@ def addverilog(self):
             None, "Warning Message",
```

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```
                        "Please accept the Makerchip Terms of Service "
                        "to proceed further.",
-                       QtWidgets.QMessageBox.Ok
+                       QtWidgets.QMessageBox.StandardButton.Ok
                )


                return
@@ -182,8 +182,8 @@ def addfile(self):
                        "Error Message",
                        "<b>Error: No Verilog File Chosen. \
                        Please choose a verilog file in Makerchip Tab</b>",
-                       QtWidgets.QMessageBox.Ok)
-               if reply == QtWidgets.QMessageBox.Ok:
+                       QtWidgets.QMessageBox.StandardButton.Ok)
+               if reply == QtWidgets.QMessageBox.StandardButton.Ok:
                        self.obj_Appconfig.print_error(
                            'No Verilog File Chosen. Please choose \
                             a verilog file in Makerchip Tab')
@@ -203,8 +203,8 @@ def addfolder(self):
                        "Error Message",
                        "<b>Error: No Verilog File Chosen. \
                        Please choose a verilog file in Makerchip Tab</b>",
-                       QtWidgets.QMessageBox.Ok)
-               if reply == QtWidgets.QMessageBox.Ok:
+                       QtWidgets.QMessageBox.StandardButton.Ok)
+               if reply == QtWidgets.QMessageBox.StandardButton.Ok:
                        self.obj_Appconfig.print_error(
                            'No Verilog File Chosen. Please choose \
                             a verilog file in Makerchip Tab')
@@ -274,9 +274,9 @@ def edit_modlst(self, text):
            ret = QtWidgets.QMessageBox.warning(
               None, "Warning", '''<b>Do you want to remove the model: ''' +
               text,
-              QtWidgets.QMessageBox.Ok, QtWidgets.QMessageBox.Cancel
+              QtWidgets.QMessageBox.StandardButton.Ok, QtWidgets.QMessageBox.
   StandardButton.Cancel
           )
-          if ret == QtWidgets.QMessageBox.Ok:
+          if ret == QtWidgets.QMessageBox.StandardButton.Ok:
              mod = open(self.digital_home + '/modpath.lst', 'r')
              data = mod.readlines()
              mod.close()
@@ -304,7 +304,7 @@ def edit_modlst(self, text):
                    None, "Error Message",
                    "The verilog model '" + str(text) +
                    "' could not be removed: " + str(err),
-                   QtWidgets.QMessageBox.Ok
+                   QtWidgets.QMessageBox.StandardButton.Ok
                )
```

```
        def lint_off_edit(self, text):
@@ -326,10 +326,10 @@ def lint_off_edit(self, text):
            "Warning",
            '''<b>Do you want to remove the lint off error: ''' +
            text,
-           QtWidgets.QMessageBox.Ok,
-           QtWidgets.QMessageBox.Cancel)
+           QtWidgets.QMessageBox.StandardButton.Ok,
+           QtWidgets.QMessageBox.StandardButton.Cancel)

-       if ret == QtWidgets.QMessageBox.Ok:
+       if ret == QtWidgets.QMessageBox.StandardButton.Ok:
            file = open(init_path + "library/tlv/lint_off.txt", 'r')
            data = file.readlines()
            file.close()
```

2.4.7 src/maker/createkicad.py

```
@@ -81,10 +81,10 @@ def createkicad(self):
            ''' already exist. Do you want to overwrite it?</b><br/>
            If yes press ok, else cancel it and ''' +
            '''change the name of your verilog model.''',
-           QtWidgets.QMessageBox.Ok, QtWidgets.QMessageBox.Cancel
+           QtWidgets.QMessageBox.StandardButton.Ok, QtWidgets.
    QMessageBox.StandardButton.Cancel
            )

-       if ret == QtWidgets.QMessageBox.Ok:
+       if ret == QtWidgets.QMessageBox.StandardButton.Ok:
            print("Overwriting existing libraries")
            self.getPortInformation()
            self.createXML()
@@ -100,7 +100,7 @@ def createkicad(self):
            self.parent, "Error", '''<b>A standard library already '''
                +
            '''exists with this name.</b><br/><b>Please change the '''
                +
            '''name of your verilog model and add it again.</b>''',
-           QtWidgets.QMessageBox.Ok
+           QtWidgets.QMessageBox.StandardButton.Ok
            )

    # getting the port information here
```

2.4.8   src/modelEditor/ModelEditor.py

```
@@ -642,7 +642,7 @@ def createXML(self, model_name):

        msg = "Model saved successfully!"
        QtWidgets.QMessageBox.information(
-           self, "Information", msg, QtWidgets.QMessageBox.Ok
+           self, "Information", msg, QtWidgets.QMessageBox.StandardButton.
    Ok
        )


        os.chdir(defaultcwd)
@@ -701,7 +701,7 @@ def savethefile(self, editfile):

        msg = "Model saved successfully!"
        QtWidgets.QMessageBox.information(
-           self, "Information", msg, QtWidgets.QMessageBox.Ok
+           self, "Information", msg, QtWidgets.QMessageBox.StandardButton.
    Ok
        )

    def removeparameter(self):
```

2.4.9   src/projManagement/openProject.py

```
@@ -82,13 +82,13 @@ def body(self):
            "<b>Error: The project doesn't contain .proj file.</b><br
                />"
            "<b>Please select the proper project directory else you won
                't"
            " be able to perform any operation</b>",
-           QtWidgets.QMessageBox.Ok | QtWidgets.QMessageBox.Cancel
+           QtWidgets.QMessageBox.StandardButton.Ok | QtWidgets.
    QMessageBox.StandardButton.Cancel
        )

-       if reply == QtWidgets.QMessageBox.Ok:
+       if reply == QtWidgets.QMessageBox.StandardButton.Ok:
            self.body()
            self.obj_Appconfig.print_info('Open Project called')
            self.obj_Appconfig.print_info(
                'Current Project is ' + self.projDir)
-       elif reply == QtWidgets.QMessageBox.Cancel:
+       elif reply == QtWidgets.QMessageBox.StandardButton.Cancel:
            self.obj_Appconfig.print_info('No Project opened')
```

2.5 Changed all occurrences of QtCore.Qt to Qt and fixed some widgets

2.5.1 List of files with QtCore.Qt to Qt changes

Example Change

```
-    QtCore.Qt.RichText
+    QtCore.Qt.RichText
```

1) src/frontEnd/Application.py (2 instances)
2) src/kicadtoNgspice/Analysis.py (1 instance)
3) src/maker/Maker.py (1 instance)
4) src/maker/NgVeri.py (1 instance)
5) src/ngspiceSimulation/pythonPlotting.py (2 instances)
6) src/ngspicetoModelica/ModelicaUI.py (1 instance)

2.5.2 List of files with Widget changes

Example Change

```
-    self.addDockWidget(QtCore.Qt.TopDockWidgetArea)
+    self.addDockWidget(Qt.DockWidgetArea.TopDockWidgetArea)
```

1) src/frontEnd/DockArea.py - Widget changes (9 instances)

2.6 Some stability fixes for PyQt6

2.6.1 src/frontEnd/Application.py

```
@@ -761,7 +761,7 @@ def open_OMedit(self):
                    <a href=https://www.openmodelica.org/download/\
                    download-windows>OpenModelica Windows</a>\
                     and install latest version.<br/>"
-                   self.msg.setTextFormat(Qt.RichText)
+                   self.msg.setTextFormat(Qt.TextFormat.RichText)
                    self.msg.setText(self.msgContent)
                    self.msg.setWindowTitle("Missing OpenModelica")
                    self.obj_appconfig.print_info(self.msgContent)
@@ -831,7 +831,7 @@ def open_OMoptim(self):
            "https://www.openmodelica.org/download/download-windows"
            ">OpenModelica Windows</a> and install latest version.<br
               />"
        )
-           self.msg.setTextFormat(Qt.RichText)
+           self.msg.setTextFormat(Qt.TextFormat.RichText)
            self.msg.setText(self.msgContent)
            self.msg.setWindowTitle("Error Message")
            self.obj_appconfig.print_info(self.msgContent)
```

2.6.2 src/kicadtoNgspice/Analysis.py

```
@@ -52,7 +52,7 @@ def createAnalysisWidget(self):
        self.grid = QtWidgets.QGridLayout()
        self.setLayout(self.grid)


-       self.grid.addWidget(self.createCheckBox(), 0, 0, Qt.AlignTop)
+       self.grid.addWidget(self.createCheckBox(), 0, 0, Qt.AlignmentFlag.
   AlignTop)
        self.grid.addWidget(self.createACgroup(), 1, 0, 5, 0)
        self.grid.addWidget(self.createDCgroup(), 1, 0, 5, 0)
        self.grid.addWidget(self.createTRANgroup(), 1, 0, 5, 0)
@@ -283,7 +283,7 @@ def createACgroup(self):
            self.ac_parameter[self.parameter_cnt] = "Hz"


        # Event listener for combo action
-       self.start_fre_combo.activated[str].connect(self.start_combovalue)
+       self.start_fre_combo.activated.connect(self.start_combovalue)


        self.parameter_cnt = self.parameter_cnt + 1
        self.stop_fre_combo = QtWidgets.QComboBox()
@@ -301,7 +301,7 @@ def createACgroup(self):
```

```
        except BaseException:
            self.ac_parameter[self.parameter_cnt] = "Hz"

-       self.stop_fre_combo.activated[str].connect(self.stop_combovalue)
+       self.stop_fre_combo.activated.connect(self.stop_combovalue)

        self.track_obj.AC_entry_var["ITEMS"] = self.ac_entry_var
        self.track_obj.AC_Parameter["ITEMS"] = self.ac_parameter
@@ -353,15 +353,15 @@ def start_combovalue(self, text):
        - Check where it is Hz, MHz, etc.
        - Accordingly set ac_parameter
        """
-       self.ac_parameter[0] = str(text)
+       self.ac_parameter[0] = self.start_fre_combo.currentText()

    def stop_combovalue(self, text):
        """
        - Handle stop_fre_combo box event
        - Check where it is Hz, MHz, etc.
        - Accordingly set ac_parameter
        """
-       self.ac_parameter[1] = str(text)
+       self.ac_parameter[1] = self.stop_fre_combo.currentText()

    def set_ac_type(self):
        """
@@ -499,7 +499,7 @@ def createDCgroup(self):
        except BaseException:
            self.dc_parameter[self.parameter_cnt] = "Volts or Amperes"

-       self.start_combo.activated[str].connect(self.start_changecombo)
+       self.start_combo.activated.connect(self.start_changecombo)
        self.parameter_cnt += 1

        self.increment_combo = QtWidgets.QComboBox(self)
@@ -516,7 +516,7 @@ def createDCgroup(self):
        except BaseException:
            self.dc_parameter[self.parameter_cnt] = "Volts or Amperes"

-       self.increment_combo.activated[str].connect(self.
    increment_changecombo)
+       self.increment_combo.activated.connect(self.increment_changecombo)
        self.parameter_cnt += 1

        self.stop_combo = QtWidgets.QComboBox(self)
@@ -533,7 +533,7 @@ def createDCgroup(self):
        except BaseException:
            self.dc_parameter[self.parameter_cnt] = "Volts or Amperes"
```

```diff
-        self.stop_combo.activated[str].connect(self.stop_changecombo)
+        self.stop_combo.activated.connect(self.stop_changecombo)
         self.parameter_cnt += 1

         self.start_combo2 = QtWidgets.QComboBox(self)
@@ -550,7 +550,7 @@ def createDCgroup(self):
         except BaseException:
             self.dc_parameter[self.parameter_cnt] = "Volts or Amperes"

-        self.start_combo2.activated[str].connect(self.start_changecombo2)
+        self.start_combo2.activated.connect(self.start_changecombo2)
         self.parameter_cnt += 1

         self.increment_combo2 = QtWidgets.QComboBox(self)
@@ -567,7 +567,7 @@ def createDCgroup(self):
         except BaseException:
             self.dc_parameter[self.parameter_cnt] = "Volts or Amperes"

-        self.increment_combo2.activated[str].connect(
+        self.increment_combo2.activated.connect(
             self.increment_changecombo2)
         self.parameter_cnt += 1

@@ -585,7 +585,7 @@ def createDCgroup(self):
         except BaseException:
             self.dc_parameter[self.parameter_cnt] = "Volts or Amperes"

-        self.stop_combo2.activated[str].connect(self.stop_changecombo2)
+        self.stop_combo2.activated.connect(self.stop_changecombo2)
         self.parameter_cnt += 1

         self.check = QtWidgets.QCheckBox('Operating Point Analysis', self)
@@ -643,27 +643,27 @@ def createDCgroup(self):
    # Below 6 functions to handle combo boxes for the DC group
    def start_changecombo(self, text):
        """Handle start combo box, ie. units, as mV, V..."""
-        self.dc_parameter[0] = str(text)
+        self.dc_parameter[0] = self.start_combo.currentText()

    def increment_changecombo(self, text):
        """Handle increment combo box, ie. units, as mV, V..."""
-        self.dc_parameter[1] = str(text)
+        self.dc_parameter[1] = self.increment_combo.currentText()

    def stop_changecombo(self, text):
        """Handle stop combo box, ie. units, as mV, V..."""
-        self.dc_parameter[2] = str(text)
+        self.dc_parameter[2] = self.stop_combo.currentText()
```

```python
    def start_changecombo2(self, text):
        """Handle second start combo box, ie. units, as mV, V..."""
-       self.dc_parameter[3] = str(text)
+       self.dc_parameter[3] = self.start_combo2.currentText()

    def increment_changecombo2(self, text):
        """Handle second increment combo box, ie. units, as mV, V..."""
-       self.dc_parameter[4] = str(text)
+       self.dc_parameter[4] = self.increment_combo2.currentText()

    def stop_changecombo2(self, text):
        """Handle second stop combo box, ie. units, as mV, V..."""
-       self.dc_parameter[5] = str(text)
+       self.dc_parameter[5] = self.stop_combo2.currentText()

    def setflag(self):
        """
@@ -747,7 +747,7 @@ def createTRANgroup(self):
        except BaseException:
            self.tran_parameter[self.parameter_cnt] = "sec"

-       self.start_combobox.activated[str].connect(self.start_combo_change)
+       self.start_combobox.activated.connect(self.start_combo_change)
        self.parameter_cnt += 1

        self.step_combobox = QtWidgets.QComboBox()
@@ -762,7 +762,7 @@ def createTRANgroup(self):
        except BaseException:
            self.tran_parameter[self.parameter_cnt] = "sec"

-       self.step_combobox.activated[str].connect(self.step_combo_change)
+       self.step_combobox.activated.connect(self.step_combo_change)
        self.parameter_cnt += 1

        self.stop_combobox = QtWidgets.QComboBox()
@@ -777,7 +777,7 @@ def createTRANgroup(self):
        except BaseException:
            self.tran_parameter[self.parameter_cnt] = "sec"

-       self.stop_combobox.activated[str].connect(self.stop_combo_change)
+       self.stop_combobox.activated.connect(self.stop_combo_change)
        self.parameter_cnt += 1

        self.track_obj.TRAN_entry_var["ITEMS"] = self.tran_entry_var
@@ -811,12 +811,12 @@ def createTRANgroup(self):
    '''

    def start_combo_change(self, text):
        """Handle start combo box, ie. units, as second, ms"""
-       self.tran_parameter[0] = str(text)
```

```
+        self.tran_parameter[0] = self.start_combobox.currentText()

    def step_combo_change(self, text):
        """Handle step combo box, ie. units, as second, ms..."""
-        self.tran_parameter[1] = str(text)
+        self.tran_parameter[1] = self.step_combobox.currentText()

    def stop_combo_change(self, text):
        """Handle stop combo box, ie. units, as second, ms..."""
-        self.tran_parameter[2] = str(text)
+        self.tran_parameter[2] = self.stop_combobox.currentText()
```

2.6.3 src/maker/Maker.py

```
@@ -90,7 +90,7 @@ def createMakerWidget(self):
        self.grid = QtWidgets.QGridLayout()
        self.setLayout(self.grid)

-        self.grid.addWidget(self.createoptionsBox(), 0, 0, Qt.AlignTop)
+        self.grid.addWidget(self.createoptionsBox(), 0, 0, Qt.AlignmentFlag
    .AlignTop)
        self.grid.addWidget(self.creategroup(), 1, 0, 5, 0)
        # self.grid.addWidget(self.creategroup(), 1, 0, 5, 0)
        self.show()
```

2.6.4 src/maker/NgVeri.py

```
@@ -75,7 +75,7 @@ def createNgveriWidget(self):
        self.grid = QtWidgets.QGridLayout()
        self.setLayout(self.grid)

-        self.grid.addWidget(self.createoptionsBox(), 0, 0, Qt.AlignTop)
+        self.grid.addWidget(self.createoptionsBox(), 0, 0, Qt.AlignmentFlag
    .AlignTop)
        self.grid.addWidget(self.creategroup(), 1, 0, 5, 0)

        self.show()
@@ -267,6 +267,7 @@ def createoptionsBox(self):
        # This function is used to remove models in modlst of Ngspice
            folder if
        # the user wants to remove a model. Note: files do not get removed
        def edit_modlst(self, text):
+            text = self.entry_var[self.count].currentText()
            if text == "Remove Verilog Models":
```

```
                return
            index = self.entry_var[1].findText(text)
@@ -313,6 +314,7 @@ def lint_off_edit(self, text):
        This is to remove lint_off comments needed by the verilator
            warnings.
        This function writes to the lint_off.txt in the library/tlv
            folder.
        '''
+       text = self.entry_var[self.count].currentText()
        init_path = '../../'
        if os.name == 'nt':
            init_path = ''
@@ -387,8 +389,8 @@ def creategroup(self):
        self.modlst.close()
        for item in self.data:
            if item != "\n":
-                self.entry_var[self.count].addItem(item.strip())
-        self.entry_var[self.count].activated[str].connect(self.edit_modlst)
+                self.entry_var[self.count].addItem(item.strip())
+        self.entry_var[self.count].activated.connect(self.edit_modlst)
        self.trgrid.addWidget(self.entry_var[self.count], 1, 4, 1, 2)
        self.count += 1
        self.entry_var[self.count] = QtWidgets.QComboBox()
@@ -404,7 +406,7 @@ def creategroup(self):
        for item in self.data:
            if item != "\n":
                self.entry_var[self.count].addItem(item.strip())
-        self.entry_var[self.count].activated[str].connect(self.
   lint_off_edit)
+        self.entry_var[self.count].activated.connect(self.lint_off_edit)
        self.trgrid.addWidget(self.entry_var[self.count], 2, 4, 1, 2)
        self.count += 1
        self.entry_var[self.count] = QtWidgets.QLineEdit(self)
```

2.6.5   src/ngspiceSimulation/NgspiceWidget.py

```
@@ -50,7 +50,7 @@ def __init__(self, command, projPath):
            (
                self.obj_appconfig.proc_dict
                [self.obj_appconfig.current_project['ProjectName']].append(
-                    self.process.pid())
+                    self.process.processId())
            )
            self.process = QtCore.QProcess(self)
            self.command = "gaw " + command.replace(".cir.out", ".raw")
```

2.6.6   src/ngspiceSimulation/pythonPlotting.py

```
@@ -141,8 +141,8 @@ def createMainFrame(self):
        self.plotfuncbtn = QtWidgets.QPushButton("Plot Function")
        self.plotfuncbtn.setToolTip('<b>Press</b> to Plot the function')

-       self.palette1.setColor(QtGui.QPalette.Foreground, Qt.blue)
-       self.palette2.setColor(QtGui.QPalette.Foreground, Qt.red)
+       self.palette1.setColor(QtGui.QPalette.ColorRole.Text, QtGui.QColor(
    Qt.GlobalColor.blue))
+       self.palette2.setColor(QtGui.QPalette.ColorRole.Text, QtGui.QColor(
    Qt.GlobalColor.red))
        self.funcName.setPalette(self.palette1)
        self.funcExample.setPalette(self.palette2)
        # Widgets for grid, plot button and multimeter button.
```

2.6.7   src/ngspicetoModelica/ModelicaUI.py

```
@@ -260,7 +260,7 @@ def callOMEdit(self):
            "https://www.openmodelica.org/download/download-windows"
            ">OpenModelica Windows</a> and install latest version.<br
                />"
            )
-           self.msg.setTextFormat(Qt.RichText)
+           self.msg.setTextFormat(Qt.TextFormat.RichText)
            self.msg.setText(self.msgContent)
            self.msg.setWindowTitle("Missing OpenModelica")
            self.obj_appconfig.print_info(self.msgContent)
```

2.6.8   src/modelEditor/ModelEditor.py

```
@@ -186,7 +186,7 @@ def bjt_click(self):
        filetype = str(self.types.currentText())
        self.openfiletype(filetype)
        # When element selected from combo box, call setfiletype
-       self.types.activated[str].connect(self.setfiletype)
+       self.types.activated.connect(self.setfiletype)

    def mos_click(self):
        '''
@@ -208,7 +208,7 @@ def mos_click(self):
        self.types.addItem('PMOS(Level-8 180um)')
        filetype = str(self.types.currentText())
        self.openfiletype(filetype)
```

```
-        self.types.activated[str].connect(self.setfiletype)
+        self.types.activated.connect(self.setfiletype)

    def jfet_click(self):
        '''
@@ -225,7 +225,7 @@ def jfet_click(self):
        self.types.addItem('P-JFET')
        filetype = str(self.types.currentText())
        self.openfiletype(filetype)
-        self.types.activated[str].connect(self.setfiletype)
+        self.types.activated.connect(self.setfiletype)

    def igbt_click(self):
        '''
@@ -242,7 +242,7 @@ def igbt_click(self):
        self.types.addItem('P-IGBT')
        filetype = str(self.types.currentText())
        self.openfiletype(filetype)
-        self.types.activated[str].connect(self.setfiletype)
+        self.types.activated.connect(self.setfiletype)

    def magnetic_click(self):
        '''
@@ -261,7 +261,7 @@ def setfiletype(self, text):
        - Get the type clicked, from text
        - Open appropriate table using openfiletype(filetype)
        '''
-        self.filetype = str(text)
+        self.filetype = self.types.currentText()
        self.openfiletype(self.filetype)

    def openfiletype(self, filetype):
```

Chapter 3

Modifying eSim installation files to support Ubuntu 20.04 and 22.04

3.1 Introduction

The modifications made to the PyQt6 installation process were essential on Ubuntu 20.04 due to compatibility issues with GLIBC. Native installation procedures were adjusted accordingly to accommodate these requirements successfully. Moreover, the PyQt6 setup on Ubuntu 20.04 necessitated additional XCB support.

For Ubuntu 22.04, a critical update was imperative for eSim to function optimally. This involved transitioning to a newer version of both ghdl and llvm, as the older versions were deprecated in this distribution. The adjustments in the installation files and configurations were paramount to ensuring a seamless integration of these upgraded dependencies.

In essence, these tailored modifications not only resolved version-related discrepancies but also facilitated a smoother and more compatible environment for the specified software components on both Ubuntu 20.04 and Ubuntu 22.04.

3.2 Required Changes

3.2.1 Enabling support for GLIBC 2.35 on Ubuntu 20.04

```
sudo apt-get install gawk bison gcc make -y
wget -c https://ftp.gnu.org/gnu/glibc/glibc-2.35.tar.gz
tar -zxvf glibc-2.35.tar.gz && cd glibc-2.35
mkdir glibc-build && cd glibc-build
../configure --prefix=lib/x86 64-linux-gnu
sudo make
sudo make install

export PYTHONPATH=$PYTHONPATH:/lib/x86_64-linux-gnu/lib

sudo rm /lib/x86_64-linux-gnu/libm.so.6

sudo ln -s /lib/x86_64-linux-gnu/lib/libm.so.6 /lib/x86_64-linux-gnu/
    libm.so.6
```

3.2.2 Enabling XCB support for PyQt6

```
sudo apt-get install libxcb-xinerama0

sudo apt-get install '^libxcb.*-dev' libx11-xcb-dev libglu1-mesa-dev
    libxrender-dev libxi-dev libxkbcommon-dev libxkbcommon-x11-dev
```

3.2.3 Changes for Ubuntu 22.04 (GHDL version 3.0.0 and LLVM version 11)

Download the source code of GHDL 3.0.0 from here

```
sudo apt install -y git make gnat zlib1g-dev llvm-dev
./configure --with-llvm-config=llvm-config-11
sudo make
sudo make install
```

Modified the install-nghdl.sh file changed the lines

```
ghdl="ghdl-0.37"
llvm_version="9"


to


ghdl="ghdl-3.0.0"
llvm_version="11"
```

Note : Placed the ghdl3.0.0 file inside nghdl.zip and changed the llvm version to 11 and ghdl version to 3.0.0 in install-nghdl.sh file.

Changed the makedefs.in file in nghdl.zip/nghdl-simulator-source/src/xspice/icm/

```
Line 17

CFLAGS = @CFLAGS@
changed to
CFLAGS = -Wl,--allow-multiple-definition
```

Note : This change was made to avoid a compilation error during installation in 22.04

Chapter 4

Fixing other issues in eSim

4.1 Fixed an out of bounds error in KicadToNgspice

4.1.1 src/kicadtoNgspice/Model.py

```
@@ -94,12 +94,8 @@ def __init__(

                    paramLabel = QtWidgets.QLabel(item)
                    modelgrid.addWidget(paramLabel, self.nextrow, 0)
-                   self.obj_trac.model_entry_var[
-                       self.nextcount
-                   ] = QtWidgets.QLineEdit()
-                   self.obj_trac.model_entry_var[
-                       self.nextcount] = QtWidgets.QLineEdit()
+                   self.obj_trac.model_entry_var.append
+                   (QtWidgets.QLineEdit())
                    self.obj_trac.model_entry_var[self.nextcount].
                        setText(
                        "")

@@ -159,7 +155,7 @@ def __init__(

                        self.obj_trac.model_entry_var[
                            self.nextcount
                        ].setText(child[i].text)
-                       self.entry_var[self.count].setText(
+                       self.entry_var[self.nextcount].setText(
                            child[0].text)
                        i = i + 1
                except BaseException:
```

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4.2 Fixed issue 260 in eSim github repository

4.2.1 src/subcircuit/Subcircuit.py

```python
from PyQt6 import QtCore, QtWidgets
from PyQt6.QtCore import Qt
from configuration.Appconfig import Appconfig
from projManagement.Validation import Validation
from subcircuit.newSub import NewSub
from subcircuit.openSub import openSub
from subcircuit.convertSub import convertSub
from subcircuit.uploadSub import UploadSub


# This class creates Subcircuit GUI.
class Subcircuit(QtWidgets.QWidget):
    """
    Creates buttons for New project, Edit existing project and
    Kicad Netlist to Ngspice Netlist converter and link them with the
    methods defined for it in other files.

        - New Project(NewSub method of newSub).
        - Open Project(openSub method of openSub).
        - Kicad to Ngspice convertor(convertSub of convertSub).
    """

    def __init__(self, parent=None):
        super(Subcircuit, self).__init__()
        QtWidgets.QWidget.__init__(self)
        self.obj_appconfig = Appconfig()
        self.obj_validation = Validation()
        self.obj_dockarea = parent
        self.layout = QtWidgets.QVBoxLayout()
        self.splitter = QtWidgets.QSplitter()
        self.splitter.setOrientation(Qt.Orientation.Vertical)

        self.newbtn = QtWidgets.QPushButton('New Subcircuit Schematic')
+       self.newbtn.setSizePolicy(QtWidgets.QSizePolicy.Expanding,
    QtWidgets.QSizePolicy.Expanding)
        self.newbtn.setToolTip('<b>To create new Subcircuit Schematic</
            b>')
-       self.newbtn.setFixedSize(200, 40)
+       self.newbtn.setMaximumSize(200,40)
        self.newbtn.clicked.connect(self.newsch)

        self.editbtn = QtWidgets.QPushButton('Edit Subcircuit Schematic
            ')
+       self.editbtn.setSizePolicy(QtWidgets.QSizePolicy.Expanding,
    QtWidgets.QSizePolicy.Expanding)
```

```
            self.editbtn.setToolTip('<b>To edit existing Subcircuit
                Schematic</b>')
-           self.editbtn.setFixedSize(200, 40)
+           self.editbtn.setMaximumSize(200,40)
            self.editbtn.clicked.connect(self.editsch)

            self.convertbtn = QtWidgets.QPushButton('Convert Kicad to
                Ngspice')
-           self.convertbtn.setToolTip(
-           '<b>To convert Subcircuit Kicad Netlist to Ngspice Netlist</b
    >')
-           self.convertbtn.setFixedSize(200, 40)
+           self.convertbtn.setSizePolicy(QtWidgets.QSizePolicy.Expanding,
    QtWidgets.QSizePolicy.Expanding)
+           self.convertbtn.setToolTip('<b>To convert Subcircuit Kicad
    Netlist to Ngspice Netlist</b>')
+           self.convertbtn.setMaximumSize(200,40)
            self.convertbtn.clicked.connect(self.convertsch)

            self.uploadbtn = QtWidgets.QPushButton('Upload a Subcircuit')
-           self.uploadbtn.setToolTip(
-               '<b>To Upload a subcircuit</b>')
-           self.uploadbtn.setFixedSize(180, 38)
+           self.uploadbtn.clicked.connect(self.uploadSub)
+           self.uploadbtn.setSizePolicy(QtWidgets.QSizePolicy.Expanding,
    QtWidgets.QSizePolicy.Expanding)
+           self.uploadbtn.setToolTip('<b>To Upload a subcircuit</b>')
            self.uploadbtn.setMaximumSize(180,38)
            self.uploadbtn.clicked.connect(self.uploadSub)

+           # set the font sizes
+           fontSize = self.calculate_font_size()
+           self.newbtn.setFont(QtGui.QFont("Sans Serif", fontSize))
+           self.editbtn.setFont(QtGui.QFont("Sans Serif", fontSize))
+           self.convertbtn.setFont(QtGui.QFont("Sans Serif", fontSize))
+           self.uploadbtn.setFont(QtGui.QFont("Sans Serif", fontSize))
+
+           # add buttons to layout
            self.hbox = QtWidgets.QHBoxLayout()
            self.hbox.addWidget(self.newbtn)
            self.hbox.addWidget(self.editbtn)
            self.hbox.addWidget(self.convertbtn)
            self.hbox.addWidget(self.uploadbtn)
            self.hbox.addStretch(1)

            self.vbox = QtWidgets.QVBoxLayout()
            self.vbox.addLayout(self.hbox)
            self.vbox.addStretch(1)
```

```python
        # link layout to the widget
        self.setLayout(self.vbox)
        self.show()

+     def calculate_font_size(self):
+         # get screen resolution
+         screen_res = QtWidgets.QApplication.desktop().screenGeometry()
+         # map resolution height to an appropriate font size
+         return screen_res.height() // 100 # adjust this scaling as per
    your need

    def newsch(self):
        text, ok = QtWidgets.QInputDialog.getText(
            self, 'New Schematic', 'Enter Schematic Name:'
        )
        if ok:
            if not text:
                print("Schematic name cannot be empty")
                print("==================")
                msg = QtWidgets.QErrorMessage(self)
                msg.setModal(True)
                msg.setWindowTitle("Error Message")
                msg.showMessage('The schematic name cannot be empty')
                msg.exec_()
                return

            self.schematic_name = (str(text))
            self.subcircuit = NewSub()
            self.subcircuit.createSubcircuit(self.schematic_name)

        else:
            print("Sub circuit creation cancelled")

    def editsch(self):
        self.obj_opensubcircuit = openSub()
        self.obj_opensubcircuit.body()

    def convertsch(self):
        self.obj_convertsubcircuit = convertSub(self.obj_dockarea)
        self.obj_convertsubcircuit.createSub()

    def uploadSub(self):
        self.obj_uploadsubcircuit = UploadSub()
        self.obj_uploadsubcircuit.upload()
```

Chapter 5

Miscellanous changes

5.1   src/frontEnd/Application.py

```
@@ -164,16 +164,16 @@ def initToolBar(self):
        # corner in the application window.
        self.spacer = QtWidgets.QWidget()
        self.spacer.setSizePolicy(
-           QtWidgets.QSizePolicy.Expanding,
-           QtWidgets.QSizePolicy.Expanding)
+           QtWidgets.QSizePolicy.Policy.Expanding,
+           QtWidgets.QSizePolicy.Policy.Expanding)
        self.topToolbar.addWidget(self.spacer)
        self.logo = QtWidgets.QLabel()
        self.logopic = QtGui.QPixmap(
            os.path.join(
                os.path.abspath(''), init_path + 'images', 'fosseeLogo.png'
            ))
        self.logopic = self.logopic.scaled(
-           QSize(150, 150), QtCore.Qt.KeepAspectRatio)
+           QSize(150, 150),Qt.AspectRatioMode.KeepAspectRatio)
        self.logo.setPixmap(self.logopic)
        self.logo.setStyleSheet("padding:0 15px 0 0;")
        self.topToolbar.addWidget(self.logo)
@@ -234,7 +234,7 @@ def initToolBar(self):

        # Adding Action Widget to tool bar
        self.lefttoolbar = QtWidgets.QToolBar('Left ToolBar')
-       self.addToolBar(QtCore.Qt.LeftToolBarArea, self.lefttoolbar)
+       self.addToolBar(Qt.ToolBarArea.LeftToolBarArea, self.lefttoolbar)
        self.lefttoolbar.addAction(self.kicad)
        self.lefttoolbar.addAction(self.conversion)
        self.lefttoolbar.addAction(self.ngspice)
```

Note : Additionally changed 17 instances of QtWidget to QtGui in Application.py

5.2 src/browser/Welcome.py

```
@@ -1,4 +1,5 @@
    from PyQt6 import QtCore, QtWidgets
+   from PyQt6.QtCore import Qt
    import os


@@ -21,7 +22,7 @@ def __init__(self):
            init_path + "library/browser/welcome.html")
        )
        self.browser.setOpenExternalLinks(True)
-       self.browser.setVerticalScrollBarPolicy(QtCore.Qt.
   ScrollBarAlwaysOff)
+       self.browser.setVerticalScrollBarPolicy(Qt.ScrollBarPolicy.
   ScrollBarAlwaysOff)

        self.vlayout.addWidget(self.browser)
        self.setLayout(self.vlayout)
```

5.3 src/frontEnd/DockArea.py

```
@@ -1,4 +1,5 @@
    from PyQt6 import QtCore, QtWidgets
+   from PyQt6.QtCore import Qt
    from ngspiceSimulation.pythonPlotting import plotWindow
    from ngspiceSimulation.NgspiceWidget import NgspiceWidget
    from configuration.Appconfig import Appconfig
@@ -49,7 +50,7 @@ def __init__(self):
            QWidget { border-radius: 15px; border: 1px solid gray;\
                padding: 5px; width: 200px; height: 150px; } \
            ")
-           self.addDockWidget(QtCore.Qt.TopDockWidgetArea, dock[
   dockName])
+           self.addDockWidget(Qt.DockWidgetArea.TopDockWidgetArea,
   dock[dockName])

        # self.tabifyDockWidget(dock['Notes'],dock['Blank'])
        self.show()
```

5.4   src/frontEnd/ProjectExplorer.py

```
    @@ -1,4 +1,5 @@
    from PyQt6 import QtCore, QtWidgets
+    from PyQt6.QtCore import Qt
    import os
    import json
    from configuration.Appconfig import Appconfig
    @@ -71,7 +72,7 @@ def __init__(self):
            self.window.addWidget(self.treewidget)
            self.treewidget.expanded.connect(self.refreshInstant)
            self.treewidget.doubleClicked.connect(self.openProject)
-            self.treewidget.setContextMenuPolicy(QtCore.Qt.
    CustomContextMenu)
+            self.treewidget.setContextMenuPolicy(Qt.ContextMenuPolicy.
    CustomContextMenu)
            self.treewidget.customContextMenuRequested.connect(self.
                openMenu)
            self.setLayout(self.window)
            self.show()
```

5.5   src/frontEnd/Workspace.py

```
@@ -68,7 +68,8 @@ def initWorkspace(self):

        # Checkbox
        self.chkbox = QtWidgets.QCheckBox('Set Default', self)
-        self.chkbox.setCheckState(int(self.obj_appconfig.workspace_check))
+        check_state = Qt.CheckState.Checked if self.obj_appconfig.
    workspace_check else Qt.CheckState.Unchecked
+        self.chkbox.setCheckState(check_state)

        # Layout
        self.grid.addWidget(self.note, 0, 0, 1, 15)
@@ -82,8 +83,8 @@ def initWorkspace(self):
        self.setGeometry(QtCore.QRect(500, 250, 400, 400))
        self.setMaximumSize(4000, 200)
        self.setWindowTitle("eSim")
-        self.setWindowFlags(QtCore.Qt.WindowStaysOnTopHint)
-        self.setWindowModality(2)
+        self.setWindowFlags(Qt.WindowType.WindowStaysOnTopHint)
+        self.setWindowModality(Qt.WindowModality.ApplicationModal)

        init_path = '../../'
        if os.name == 'nt':
```

5.6   src/ngspiceSimulation/pythonPlotting.py

```
@@ -2,6 +2,7 @@
    # eg: 2/3=0.66 and not '0' 6/2=3.0 and 6//2=3
    import os
    from PyQt6 import QtGui, QtCore, QtWidgets
+   from PyQt6.QtCore import Qt
    from decimal import Decimal, getcontext
    from matplotlib.backends.backend_qt5agg\
        import FigureCanvasQTAgg as FigureCanvas
@@ -559,7 +560,7 @@ def __init__(self, node_branch, rmsValue, loc_x, loc_y
, voltFlag):
        self.setGeometry(loc_x, loc_y, 200, 100)
        self.setGeometry(loc_x, loc_y, 300, 100)
        self.setWindowTitle("MultiMeter")
-       self.setWindowFlags(QtCore.Qt.WindowStaysOnTopHint)
+       self.setWindowFlags(Qt.WindowType.WindowStaysOnTopHint)
        self.show()
```

Chapter 6

Conclusion

The successful porting of eSim from PyQt5 to PyQt6 marks a significant enhancement in the application's compatibility with the latest technologies. This transition not only ensures improved stability and performance but also aligns eSim with current software standards. The collective effort and guidance received throughout this project have been instrumental in overcoming the challenges encountered during the porting process. The modifications and updates implemented are poised to facilitate a more seamless user experience, thereby reinforcing eSim's position as a reliable and accessible EDA tool for the community. The fellowship at FOSSEE has been a profoundly enriching journey, offering invaluable exposure to open-source software development and the intricacies of application porting. The knowledge and skills acquired are a testament to the collaborative learning environment fostered by the FOSSEE team and the mentorship provided by esteemed professionals in the field. As we look forward to the continued evolution of eSim, the contributions made during this fellowship will undoubtedly serve as a cornerstone for future developments.

Chapter 7

References

- Stack Overflow
- Spoken Tutorial
- PyQt6 Docs