**МИНИСТЕРСТВО ЦИФРОВОГО РАЗВИТИЯ,**

**СВЯЗИ И МАССОВЫХ КОММУНИКАЦИЙ РОССИЙСКОЙ ФЕДЕРАЦИИ**

**ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ ВЫСШЕГО ОБРАЗОВАНИЯ**

**«САНКТ-ПЕТЕРБУРГСКИЙ ГОСУДАРСТВЕННЫЙ УНИВЕРСИТЕТ ТЕЛЕКОММУНИКАЦИЙ ИМ. ПРОФ. М.А. БОНЧ-БРУЕВИЧА» (СПбГУТ)**

Факультет: Инфокоммуникационных сетей и систем Кафедра: Защищенных систем связи

Дисциплина: Защищенные операционные системы

ОТЧЕТ ПО ЛАБОРАТОРНОЙ РАБОТЕ №6.3

Графический интерфейс

*(тема отчета)*

Направление/специальность подготовки

10.03.01 Информационная безопасность

*(код и наименование направления/специальности)*

Студент:

Емельянов Н.Р. ИКБ-32

*(Ф.И.О., № группы) (подпись)*

Михайлов И.Д. ИКБ-32

*(Ф.И.О., № группы) (подпись)*

Преподаватель:

Асс. Смирнов Д.Н.

*(Должность, Ф.И.О. преподавателя) (подпись)*

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**Цель**

Написать интерактивный калькулятор с использованием PyQt5.

**Задачи**

Основные задачи на лабораторную работу:

1. Реализовать интерфейст с кнопками для ввода цифр и выполнения математических операций
2. Добавить поле для вывода результатов вычислений
3. Обработать события нажатия кнопок и выполнить соответствующие операции

**Ход выполнения**

Шаги выполнения лабораторной работы:

1. И
2. И
3. И
4. И
5. И
6. И
7. И
8. И

**Листинг программы**

from PyQt5 import QtCore, QtGui, QtWidgets

class Ui\_MainWindow(object):

def setupUi(self, MainWindow):

MainWindow.setObjectName("MainWindow")

MainWindow.resize(299, 378)

MainWindow.setBaseSize(QtCore.QSize(300, 300))

self.centralwidget = QtWidgets.QWidget(MainWindow)

self.centralwidget.setObjectName("centralwidget")

self.verticalLayout = QtWidgets.QVBoxLayout(self.centralwidget)

self.verticalLayout.setObjectName("verticalLayout")

self.label = QtWidgets.QLabel(self.centralwidget)

sizePolicy = QtWidgets.QSizePolicy(QtWidgets.QSizePolicy.Preferred, QtWidgets.QSizePolicy.Expanding)

sizePolicy.setHorizontalStretch(0)

sizePolicy.setVerticalStretch(0)

sizePolicy.setHeightForWidth(self.label.sizePolicy().hasHeightForWidth())

self.label.setSizePolicy(sizePolicy)

font = QtGui.QFont()

font.setPointSize(28)

self.label.setFont(font)

self.label.setText("")

self.label.setObjectName("label")

self.verticalLayout.addWidget(self.label)

self.horizontalLayout\_7 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_7.setObjectName("horizontalLayout\_7")

self.pushButton\_off = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_off.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_off.setFont(font)

self.pushButton\_off.setStyleSheet("background-color: rgb(121, 121, 121);")

self.pushButton\_off.setObjectName("pushButton\_off")

self.horizontalLayout\_7.addWidget(self.pushButton\_off)

self.pushButton\_AC = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_AC.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_AC.setFont(font)

self.pushButton\_AC.setStyleSheet("background-color: rgb(121, 121, 121);")

self.pushButton\_AC.setObjectName("pushButton\_AC")

self.horizontalLayout\_7.addWidget(self.pushButton\_AC)

self.pushButton\_perc = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_perc.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_perc.setFont(font)

self.pushButton\_perc.setStyleSheet("background-color: rgb(121, 121, 121);")

self.pushButton\_perc.setObjectName("pushButton\_perc")

self.horizontalLayout\_7.addWidget(self.pushButton\_perc)

self.pushButton\_split = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_split.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_split.setFont(font)

self.pushButton\_split.setStyleSheet("background-color: rgb(121, 121, 121);")

self.pushButton\_split.setObjectName("pushButton\_split")

self.horizontalLayout\_7.addWidget(self.pushButton\_split)

self.verticalLayout.addLayout(self.horizontalLayout\_7)

self.horizontalLayout\_6 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_6.setObjectName("horizontalLayout\_6")

self.pushButton\_7 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_7.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_7.setFont(font)

self.pushButton\_7.setObjectName("pushButton\_7")

self.horizontalLayout\_6.addWidget(self.pushButton\_7)

self.pushButton\_8 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_8.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_8.setFont(font)

self.pushButton\_8.setObjectName("pushButton\_8")

self.horizontalLayout\_6.addWidget(self.pushButton\_8)

self.pushButton\_9 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_9.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_9.setFont(font)

self.pushButton\_9.setObjectName("pushButton\_9")

self.horizontalLayout\_6.addWidget(self.pushButton\_9)

self.pushButton\_multiple = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_multiple.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_multiple.setFont(font)

self.pushButton\_multiple.setStyleSheet("background-color: rgb(121, 121, 121);")

self.pushButton\_multiple.setObjectName("pushButton\_multiple")

self.horizontalLayout\_6.addWidget(self.pushButton\_multiple)

self.verticalLayout.addLayout(self.horizontalLayout\_6)

self.horizontalLayout\_5 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_5.setObjectName("horizontalLayout\_5")

self.pushButton\_4 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_4.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_4.setFont(font)

self.pushButton\_4.setObjectName("pushButton\_4")

self.horizontalLayout\_5.addWidget(self.pushButton\_4)

self.pushButton\_5 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_5.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_5.setFont(font)

self.pushButton\_5.setObjectName("pushButton\_5")

self.horizontalLayout\_5.addWidget(self.pushButton\_5)

self.pushButton\_6 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_6.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_6.setFont(font)

self.pushButton\_6.setObjectName("pushButton\_6")

self.horizontalLayout\_5.addWidget(self.pushButton\_6)

self.pushButton\_minus = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_minus.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_minus.setFont(font)

self.pushButton\_minus.setStyleSheet("background-color: rgb(121, 121, 121);")

self.pushButton\_minus.setObjectName("pushButton\_minus")

self.horizontalLayout\_5.addWidget(self.pushButton\_minus)

self.verticalLayout.addLayout(self.horizontalLayout\_5)

self.horizontalLayout\_4 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_4.setObjectName("horizontalLayout\_4")

self.pushButton\_1 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_1.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_1.setFont(font)

self.pushButton\_1.setObjectName("pushButton\_1")

self.horizontalLayout\_4.addWidget(self.pushButton\_1)

self.pushButton\_2 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_2.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_2.setFont(font)

self.pushButton\_2.setObjectName("pushButton\_2")

self.horizontalLayout\_4.addWidget(self.pushButton\_2)

self.pushButton\_3 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_3.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_3.setFont(font)

self.pushButton\_3.setObjectName("pushButton\_3")

self.horizontalLayout\_4.addWidget(self.pushButton\_3)

self.pushButton\_plus = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_plus.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_plus.setFont(font)

self.pushButton\_plus.setStyleSheet("background-color: rgb(121, 121, 121);")

self.pushButton\_plus.setObjectName("pushButton\_plus")

self.horizontalLayout\_4.addWidget(self.pushButton\_plus)

self.verticalLayout.addLayout(self.horizontalLayout\_4)

self.horizontalLayout\_3 = QtWidgets.QHBoxLayout()

self.horizontalLayout\_3.setObjectName("horizontalLayout\_3")

self.pushButton\_00 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_00.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_00.setFont(font)

self.pushButton\_00.setObjectName("pushButton\_00")

self.horizontalLayout\_3.addWidget(self.pushButton\_00)

self.pushButton\_0 = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_0.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_0.setFont(font)

self.pushButton\_0.setObjectName("pushButton\_0")

self.horizontalLayout\_3.addWidget(self.pushButton\_0)

self.pushButton\_point = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_point.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_point.setFont(font)

self.pushButton\_point.setObjectName("pushButton\_point")

self.horizontalLayout\_3.addWidget(self.pushButton\_point)

self.pushButton\_final = QtWidgets.QPushButton(self.centralwidget)

self.pushButton\_final.setMinimumSize(QtCore.QSize(50, 50))

font = QtGui.QFont()

font.setPointSize(11)

self.pushButton\_final.setFont(font)

self.pushButton\_final.setStyleSheet("background-color: rgb(255, 85, 0);")

self.pushButton\_final.setObjectName("pushButton\_final")

self.horizontalLayout\_3.addWidget(self.pushButton\_final)

self.verticalLayout.addLayout(self.horizontalLayout\_3)

MainWindow.setCentralWidget(self.centralwidget)

self.retranslateUi(MainWindow)

QtCore.QMetaObject.connectSlotsByName(MainWindow)

def retranslateUi(self, MainWindow):

\_translate = QtCore.QCoreApplication.translate

MainWindow.setWindowTitle(\_translate("MainWindow", "MainWindow"))

self.pushButton\_off.setText(\_translate("MainWindow", "OFF"))

self.pushButton\_AC.setText(\_translate("MainWindow", "AC"))

self.pushButton\_perc.setText(\_translate("MainWindow", "%"))

self.pushButton\_split.setText(\_translate("MainWindow", "/"))

self.pushButton\_7.setText(\_translate("MainWindow", "7"))

self.pushButton\_8.setText(\_translate("MainWindow", "8"))

self.pushButton\_9.setText(\_translate("MainWindow", "9"))

self.pushButton\_multiple.setText(\_translate("MainWindow", "\*"))

self.pushButton\_4.setText(\_translate("MainWindow", "4"))

self.pushButton\_5.setText(\_translate("MainWindow", "5"))

self.pushButton\_6.setText(\_translate("MainWindow", "6"))

self.pushButton\_minus.setText(\_translate("MainWindow", "-"))

self.pushButton\_1.setText(\_translate("MainWindow", "1"))

self.pushButton\_2.setText(\_translate("MainWindow", "2"))

self.pushButton\_3.setText(\_translate("MainWindow", "3"))

self.pushButton\_plus.setText(\_translate("MainWindow", "+"))

self.pushButton\_00.setText(\_translate("MainWindow", "00"))

self.pushButton\_0.setText(\_translate("MainWindow", "0"))

self.pushButton\_point.setText(\_translate("MainWindow", "."))

self.pushButton\_final.setText(\_translate("MainWindow", "="))

На рисунках 1, 2, 3 представлены этапы работы кода:

Рис. 1 –

Рис. 2 –

Рис. 3 –

**Вывод**

В ходе выполнения лабораторной работы был написать интерактивный калькулятор с использованием PyQt5. Это было сделано в ходе выполнения следующих шагов:

1. Импортировали необходимые библиотеки
2. ???