

МИНИСТЕРСТВО НАУКИ И ВЫСШЕГО ОБРАЗОВАНИЯ РОССИЙСКОЙ ФЕДЕРАЦИИ
ФЕДЕРАЛЬНОЕ ГОСУДАРСТВЕННОЕ БЮДЖЕТНОЕ ОБРАЗОВАТЕЛЬНОЕ УЧРЕЖДЕНИЕ
ВЫСШЕГО ОБРАЗОВАНИЯ
«БЕЛГОРОДСКИЙ ГОСУДАРСТВЕННЫЙ ТЕХНОЛОГИЧЕСКИЙ
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ИНСТИТУТ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ И УПРАВЛЯЮЩИХ СИСТЕМ

Лабораторная работа №13

по дисциплине: ООП

тема: «Знакомство с библиотеками языка Python. PyQT.»

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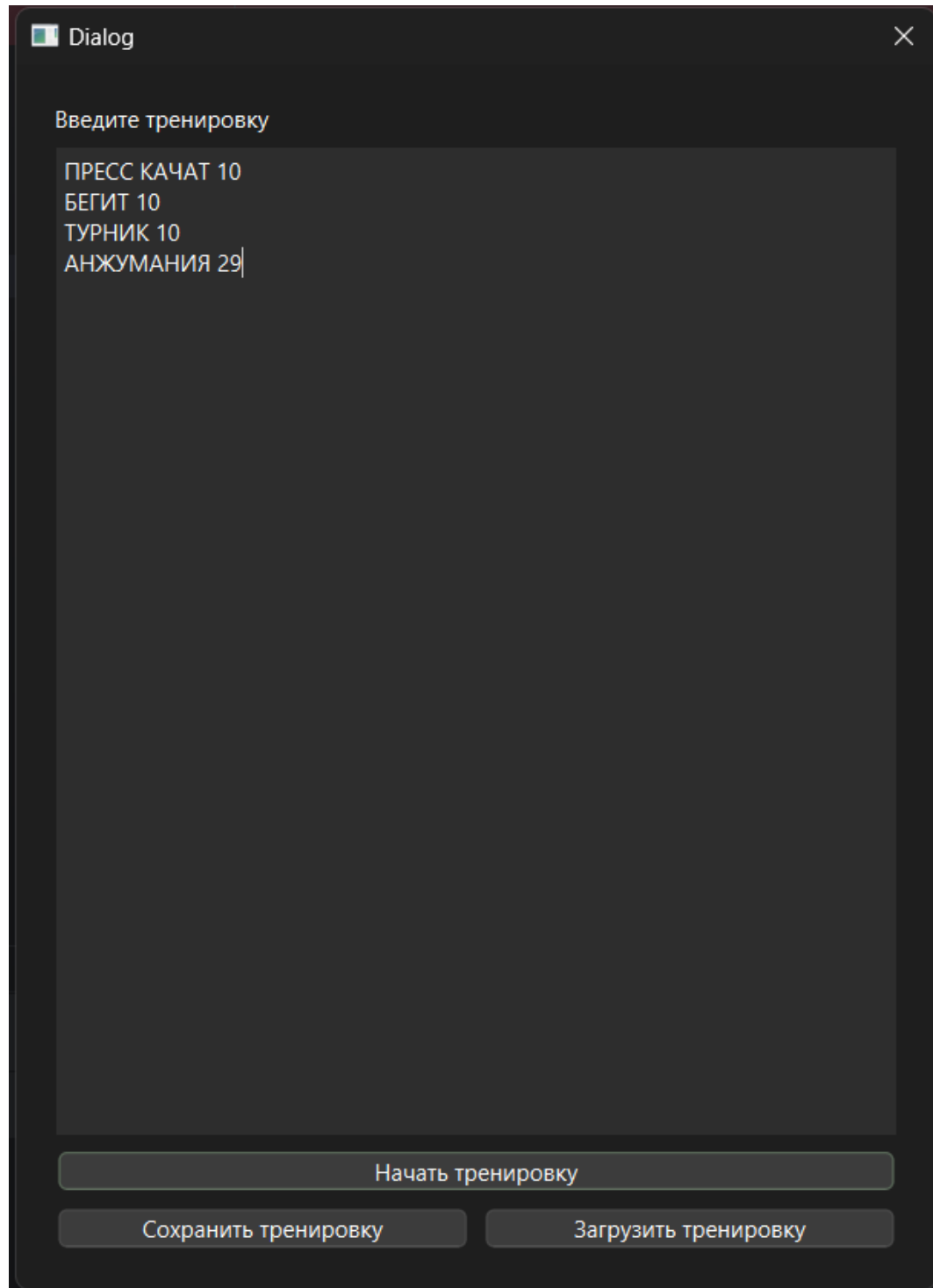
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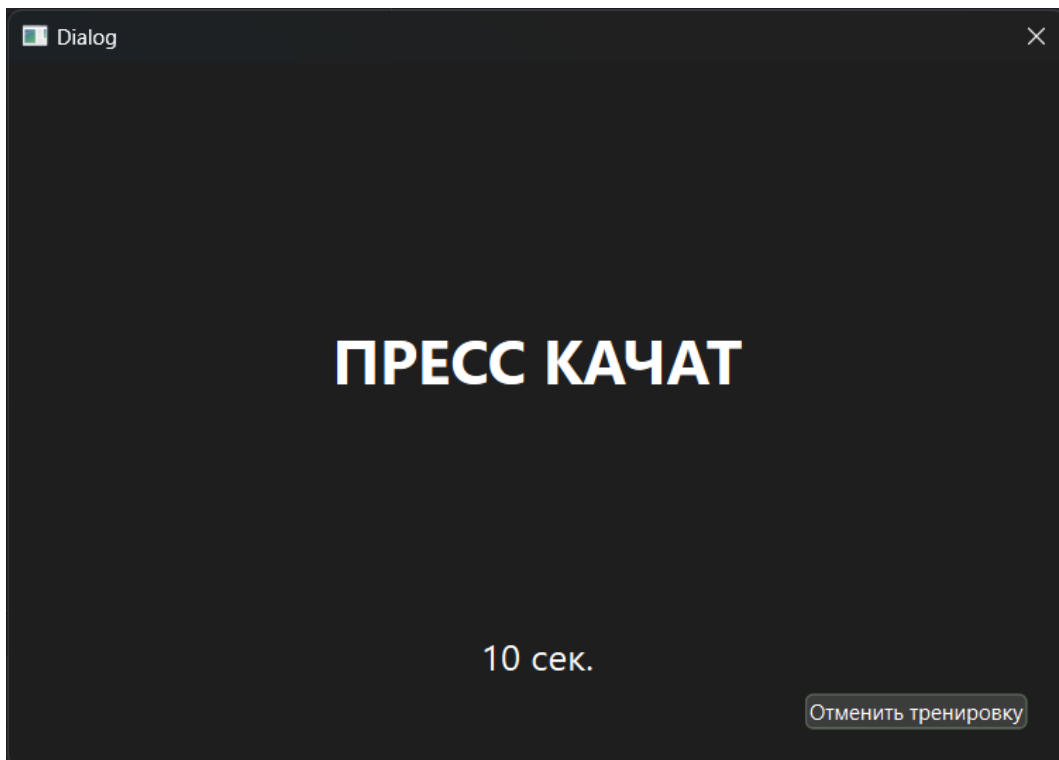
Белгород 2024 г.

Лабораторная работа №13
«Знакомство с библиотеками языка Python. PyQT.»
Вариант 10

Цель работы: приобретение практических навыков создания приложений на языке Python, QT приложения.

QT-Фитнес инструктор (составление тренировок)





```
import sys

from PySide6.QtWidgets import QApplication

from widgets.init_train_dialog import InitTrainDialog

if __name__ == "__main__":
    app = QApplication(sys.argv)
    dialog = InitTrainDialog()
    dialog.show()
    sys.exit(app.exec())
```

```
class TrainStep:
    def __init__(self, desc: str, time: int):
        self.desc = desc
        self.time = time
```

```
import threading

def debounce(wait_time):
    def decorator(function):
        def debounced(*args, **kwargs):
            def call_function():
                debounced._timer = None
                return function(*args, **kwargs)
            # if we already have a call to the function currently waiting to be executed, reset the timer
            if debounced._timer is not None:
                debounced._timer.cancel()
```

```

        # after wait_time, call the function provided to the decorator with its arguments
        debounced._timer = threading.Timer(wait_time, call_function)
        debounced._timer.start()

    debounced._timer = None
    return debounced

return decorator

```

```

from PySide6.QtWidgets import QDialog, QDialogBox

from src.lab13.models.train_step import TrainStep
from src.lab13.utils.debounce import debounce
from src.lab13.widgets import ui_init_train, train_dialog

class InitTrainDialog(QDialog):
    MESSAGE_NORMAL = "Введите тренировку"
    MESSAGE_INCORRECT = "Формат тренировки неправильный"
    MESSAGE_SAVED = "Тренировка сохранена"
    MESSAGE_YOURE_TYPING = "Вы печатаете..."

    def __init__(self, parent=None):
        super().__init__(parent)
        self.ui = ui_init_train.Ui_Dialog()
        self.ui.setupUi(self)

        self.ui.savetrain.clicked.connect(self.savetrain)
        self.ui.loadtrain.clicked.connect(self.loadtrain)
        self.ui.beginttrain.clicked.connect(self.beginttrain)
        self.ui.train.textChanged.connect(self.train_text_edit)
        self.ui.message.setText(InitTrainDialog.MESSAGE_NORMAL)

    def train_text_edit(self):
        self.ui.message.setText(InitTrainDialog.MESSAGE_YOURE_TYPING)
        self.train_text_edit_check_syntax()

    @debounce(1)
    def train_text_edit_check_syntax(self):
        if self.check_syntax():
            self.ui.message.setText(InitTrainDialog.MESSAGE_NORMAL)
        else:
            self.ui.message.setText(InitTrainDialog.MESSAGE_INCORRECT)

    def check_syntax(self):
        try:
            train_steps = [TrainStep(" ".join(line.split()[:-1]), int(line.split()[-1])) for line in
↪ self.ui.train.toPlainText().strip().splitlines()]

            return train_steps
        except Exception as e:
            return None

```

```

def savetrain(self):
    if not self.check_syntax():
        self.ui.message.setText(InitTrainDialog.MESSAGE_INCORRECT)
        return

    filename = QFileDialog.getSaveFileName(self,
        "Сохранить тренировку", "", "Файлы тренировки (*.train)")

    if len(filename[0]) == 0:
        return

    with open(filename[0], 'w', encoding='utf-8') as f:
        f.write(self.ui.train.toPlainText().strip())

    self.ui.message.setText(InitTrainDialog.MESSAGE_SAVED)

def loadtrain(self):
    filename = QFileDialog.getOpenFileName(self, "Загрузить тренировку", "", "Файлы тренировки (*.train)")

    if len(filename[0]) == 0:
        return

    with open(filename[0], 'r', encoding='utf-8') as f:
        self.ui.train.setPlainText("".join(list(f.readlines()))))

    self.ui.message.setText(InitTrainDialog.MESSAGE_NORMAL)

def begintrain(self):
    train = self.check_syntax()
    if not train:
        self.ui.message.setText(InitTrainDialog.MESSAGE_INCORRECT)
        return

    self.hide()

    train = train_dialog.TrainDialog(train)
    train.setModal(True)
    train.exec()

    self.show()

```

```

from PySide6.QtCore import QTimer
from PySide6.QtWidgets import QDialog

from src.lab13.models.train_step import TrainStep
from src.lab13.widgets import ui_train

import datetime

class TrainDialog(QDialog):
    MESSAGE_READY = 'Приготовиться!'
    MESSAGE_END = 'Тренировка окончена!'
    MESSAGE_END_SEC = 'Вы - молодец!'

```

```

def __init__(self, train, parent=None):
    super().__init__(parent)
    self.ui = ui_train.Ui_Dialog()
    self.ui.setupUi(self)

    self.train = [TrainStep(TrainDialog.MESSAGE_READY, 5)]
    self.train.extend(train)
    self.ui.canceltrain.clicked.connect(self.cancel_train)
    self.start = datetime.datetime.now()
    self.timer = QTimer(self)
    self.timer.timeout.connect(self.tick)
    self.timer.setInterval(100)
    self.timer.start()

def __del__(self):
    self.timer.stop()

def cancel_train(self):
    self.timer.stop()
    self.accept()

def tick(self):
    nowtime = datetime.datetime.now()
    sum_time = 0
    fitting = None

    for item in self.train:
        if datetime.timedelta(seconds=item.time + sum_time) + self.start > nowtime:
            fitting = item
            break
        sum_time += item.time

    if fitting:
        seconds_left = 1 + (datetime.timedelta(seconds=fitting.time + sum_time) + self.start - nowtime).seconds
        self.ui.trainname.setText(fitting.desc)
        self.ui.traintime.setText(f'{seconds_left} сек.')
    else:
        self.ui.trainname.setText(TrainDialog.MESSAGE_END)
        self.ui.traintime.setText(TrainDialog.MESSAGE_END_SEC)
        self.timer.stop()

```

```
# -*- coding: utf-8 -*-
```

```

#####
## Form generated from reading UI file 'init_train.ui'
##
## Created by: Qt User Interface Compiler version 6.7.0
##
## WARNING! All changes made in this file will be lost when recompiling UI file!
#####

```

```

from PySide6.QtCore import (QCoreApplication, QDate, QDateTime, QLocale,
    QMetaObject, QObject, QPoint, QRect,
    QSize, QTime, QUrl, Qt)
from PySide6.QtGui import (QBrush, QColor, QConicalGradient, QCursor,
    QFont, QFontDatabase, QGradient, QIcon,
    QImage, QKeySequence, QLinearGradient, QPainter,
    QPalette, QPixmap, QRadialGradient, QTransform)
from PySide6.QtWidgets import (QApplication, QDialog, QHBoxLayout, QLabel,
    QLineEdit, QPushButton, QSizePolicy, QVBoxLayout,
    QWidget)

class Ui_Dialog(object):
    def setupUi(self, Dialog):
        if not Dialog.setObjectName():
            Dialog.setObjectName(u"Dialog")
        Dialog.resize(480, 640)
        self.verticalLayoutWidget = QWidget(Dialog)
        self.verticalLayoutWidget.setObjectName(u"verticalLayoutWidget")
        self.verticalLayoutWidget.setGeometry(QRect(20, 20, 440, 600))
        self.verticalLayout = QVBoxLayout(self.verticalLayoutWidget)
        self.verticalLayout.setObjectName(u"verticalLayout")
        self.verticalLayout.setContentsMargins(0, 0, 0, 0)
        self.message = QLabel(self.verticalLayoutWidget)
        self.message.setObjectName(u"message")

        self.verticalLayout.addWidget(self.message)

        self.train = QLineEdit(self.verticalLayoutWidget)
        self.train.setObjectName(u"train")

        self.verticalLayout.addWidget(self.train)

        self.begintrain = QPushButton(self.verticalLayoutWidget)
        self.begintrain.setObjectName(u"begintrain")

        self.verticalLayout.addWidget(self.begintrain)

        self.horizontalLayout = QHBoxLayout()
        self.horizontalLayout.setObjectName(u"horizontalLayout")
        self.savetrain = QPushButton(self.verticalLayoutWidget)
        self.savetrain.setObjectName(u"savetrain")

        self.horizontalLayout.addWidget(self.savetrain)

        self.loadtrain = QPushButton(self.verticalLayoutWidget)
        self.loadtrain.setObjectName(u"loadtrain")

        self.horizontalLayout.addWidget(self.loadtrain)

        self.verticalLayout.addLayout(self.horizontalLayout)

        self.retranslateUi(Dialog)

```

```

    QMetaObject.connectSlotsByName(Dialog)

# setupUi

def retranslateUi(self, Dialog):
    Dialog.setWindowTitle(QCoreApplication.translate("Dialog", u"Dialog", None))
    self.message.setText(QCoreApplication.translate("Dialog", u"TextLabel", None))
    self.begintrain.setText(QCoreApplication.translate("Dialog", u"\u0041d\u0043\u0047\u0043\u0042\u0044c
    ↪ \u0042\u0040\u0043\u0043d\u00438\u0040\u0043e\u00432\u0043a\u00443", None))
    self.savetrain.setText(QCoreApplication.translate("Dialog",
    ↪ u"\u00421\u0043e\u00445\u0040\u0043\u0043d\u00438\u00442\u0044c
    ↪ \u0042\u0040\u0043\u0043d\u00438\u0040\u0043e\u00432\u0043a\u00443", None))
    self.loadtrain.setText(QCoreApplication.translate("Dialog",
    ↪ u"\u00417\u0043\u00433\u0040\u00443\u00437\u00438\u00442\u0044c
    ↪ \u0042\u0040\u0043\u0043d\u00438\u0040\u0043e\u00432\u0043a\u00443", None))

# retranslateUi

```

```

# -*- coding: utf-8 -*-

#####
## Form generated from reading UI file 'train.ui'
##
## Created by: Qt User Interface Compiler version 6.7.0
##
## WARNING! All changes made in this file will be lost when recompiling UI file!
#####

from PySide6.QtCore import (QCoreApplication, QDate, QDateTime, QLocale,
    QMetaObject, QObject, QPoint, QRect,
    QSize, QTime, QUrl, Qt)
from PySide6.QtGui import (QBrush, QColor, QConicalGradient, QCursor,
    QFont, QFontDatabase, QGradient, QIcon,
    QImage, QKeySequence, QLinearGradient, QPainter,
    QPalette, QPixmap, QRadialGradient, QTransform)
from PySide6.QtWidgets import (QApplication, QDialog, QLabel, QPushButton,
    QSizePolicy, QVBoxLayout, QWidget)

class Ui_Dialog(object):
    def setupUi(self, Dialog):
        if not Dialog.setObjectName():
            Dialog.setObjectName(u"Dialog")
        Dialog.resize(600, 400)
        self.verticalLayoutWidget = QWidget(Dialog)
        self.verticalLayoutWidget.setObjectName(u"verticalLayoutWidget")
        self.verticalLayoutWidget.setGeometry(QRect(20, 20, 560, 360))
        self.verticalLayout = QVBoxLayout(self.verticalLayoutWidget)
        self.verticalLayout.setObjectName(u"verticalLayout")
        self.verticalLayout.setContentsMargins(0, 0, 0, 0)
        self.trainname = QLabel(self.verticalLayoutWidget)
        self.trainname.setObjectName(u"trainname")
        self.trainname.setLayoutDirection(Qt.LayoutDirection.LeftToRight)
        self.trainname.setStyleSheet(u"font: 700 26pt \"Segoe UI\";")
        self.trainname.setTextFormat(Qt.TextFormat.AutoText)

```



```

self.trainname.setAlignment(Qt.AlignmentFlag.AlignCenter)
self.trainname.setWordWrap(True)

self.verticalLayout.addWidget(self.trainname)

self.traintime = QLabel(self.verticalLayoutWidget)
self.traintime.setObjectName(u"traintime")
sizePolicy = QSizePolicy(QSizePolicy.Policy.Preferred, QSizePolicy.Policy.Fixed)
sizePolicy.setHorizontalStretch(0)
sizePolicy.setVerticalStretch(0)
sizePolicy.setHeightForWidth(self.traintime.sizePolicy().hasHeightForWidth())
self.traintime.setSizePolicy(sizePolicy)
self.traintime.setStyleSheet(u"font: 16pt \"Segoe UI\";")
self.traintime.setAlignment(Qt.AlignmentFlag.AlignHCenter|Qt.AlignmentFlag.AlignTop)

self.verticalLayout.addWidget(self.traintime)

self.canceltrain = QPushButton(self.verticalLayoutWidget)
self.canceltrain.setObjectName(u"canceltrain")
sizePolicy1 = QSizePolicy(QSizePolicy.Policy.Fixed, QSizePolicy.Policy.Fixed)
sizePolicy1.setHorizontalStretch(0)
sizePolicy1.setVerticalStretch(0)
sizePolicy1.setHeightForWidth(self.canceltrain.sizePolicy().hasHeightForWidth())
self.canceltrain.setSizePolicy(sizePolicy1)
self.canceltrain.setLayoutDirection(Qt.LayoutDirection.LeftToRight)
self.canceltrain.setAutoDefault(True)
self.canceltrain.setFlat(False)

self.verticalLayout.addWidget(self.canceltrain, 0, Qt.AlignmentFlag.AlignRight)

self.retranslateUi(Dialog)

self.canceltrain.setDefault(False)

QMetaObject.connectSlotsByName(Dialog)
# setupUi

def retranslateUi(self, Dialog):
    Dialog.setWindowTitle(QCoreApplication.translate("Dialog", u"Dialog", None))
    self.trainname.setText(QCoreApplication.translate("Dialog",
↵ u"\u0422\u0440\u0435\u043d\u0438\u0440\u043e\u0432\u043a\u0430\u0430
↵ \u0442\u0440\u0435\u043d\u0438\u0440\u043e\u0432\u043a\u0430\u0430
↵ \u0442\u0440\u0435\u043d\u0438\u0440\u043e\u0432\u043a\u0430\u0430", None))
    self.traintime.setText(QCoreApplication.translate("Dialog", u"30 \u0441\u0435\u043a.", None))
    self.canceltrain.setText(QCoreApplication.translate("Dialog", u"\u041e\u0442\u043c\u0435\u043d\u0442\u0443
↵ \u0442\u0440\u0435\u043d\u0438\u0440\u043e\u0432\u043a\u0430\u0443", None))
# retranslateUi

```

Ссылка на репозиторий

Вывод: в ходе лабораторной работы приобрели практические навыки создания приложений на языке Python, QT приложения.