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'''
Lab 2

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CIS 41B

User Interface - Uses tkinter and EnrollData class to create a graphic
interface. Displays plots create from given file.
'''

from enrolldata import EnrollData

import tkinter as tk
import tkinter.messagebox  as  tkmb

import matplotlib
matplotlib.use('TkAgg')                                          # tell
matplotlib to work with Tkinter
from matplotlib.backends.backend_tkagg import FigureCanvasTkAgg  # Canvas
widget
import matplotlib.pyplot as plt                                    #
normal import of pyplot to plot

FILENAME = "students2.csv"                                       #const
variable for file name

class mainWin (tk.Tk):
    # Creates the main window with the widgets: 2 buttons for 2 plots and
a label
    def __init__(self):
        super().__init__()
        self.geometry("300x75")
        self.title("CCC Enrollment")
        description = "Enrollment data for California Community Colleges"
        L1 = tk.Label(self, text=description, fg="blue")
        L1.grid(row=0, column = 0,columnspan = 2)
        self.columnconfigure(1, weight =1)

        try:
            self.ed = EnrollData(FILENAME)
            self.ed.readFile()
            self.yearsArr = self.ed.getYearArr()
        except FileNotFoundError:
            fw = fileExceptWin()
            self.destroy()
            return

        F1 = tk.Frame(self)
    #Button for Enrollment Trend By Year

        B1_main = tk.Button(F1, text = "Enrollment Trend", command =
self.getPlotWin)
        B1_main.grid(row = 1, column = 0)
    #Button for Enrollment Trend By Age
        B2_main = tk.Button(F1, text = "Enrollment By Age", command =
self.getDialogBox)
        B2_main.grid(row = 1, column = 1)

        F1.grid(row = 1, column= 1)

    # Creates a Toplevel dialog box for user to specify year
    def getDialogBox(self):
        return self.wait_window(dialogBox(self))

    # Creates plotWin to plot the enrollment trend plot
    def getPlotWin(self):
        pw = plotWin(self)
        pw.enrollTrendPlt()


# Dialog Box Window after user chooses Enrollement

class dialogBox(tk.Toplevel):
    # Constructs dialogBox object and its widgets: radiobuttons and a
confirm button
    def __init__(self, master):
        super().__init__(master)

        self.grab_set()
        self.focus_set()
        self.transient()

        self.geometry()
        self.title("Enrollment By Age")

        self.year = 0

        # RADIO BUTTONS in for loop
        count = 0
        F2 = tk.Frame(self)
        radiobuttons = []
        controlVar = tk.IntVar()

        for i in range(len(self.master.yearsArr)):
            count += 1
            rb = tk.Radiobutton(F2, text = str(self.master.yearsArr[i]),
variable=controlVar, value= count, command = lambda :
self.setYear(controlVar.get()))
            radiobuttons.append(rb)
            radiobuttons[i].grid(row = 0 , column = i)

        controlVar.set(1)                   #set first button as default

        '''
        # MANUALLY CREATE BUTTON
        rb1 = tk.Radiobutton(F2, text = "2014", variable=controlVar,
value= 1, command = lambda : self.setYear(controlVar.get()))
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        rb1.grid(row = 0, column = 2)

        rb2 = tk.Radiobutton(F2, text="2015", variable=controlVar,
value=2, command = lambda : self.setYear(controlVar.get()))
        rb2.grid(row = 0, column = 3)

        rb3 = tk.Radiobutton(F2, text = "2016", variable=controlVar,
value=3, command = lambda : self.setYear(controlVar.get()))
        rb3.grid(row = 0, column = 4)

        rb4 = tk.Radiobutton(F2, text="2017", variable=controlVar,
value=4, command = lambda : self.setYear(controlVar.get()))
        rb4.grid(row = 0, column = 5)
        '''

        #OK BUTTON
        confirm_bttn = tk.Button(F2, text = "OK", command =
self.getPlotWin)
        confirm_bttn.grid(row = 1, column = 2)
        F2.grid()


    # Uses control variable to set year that will be passed into function
    def setYear(self, var):
        self.year = self.master.yearsArr[var-1]

    #Plots after year is set by creating a plot window
    def getPlotWin(self):
        pw = plotWin(self.master)
        pw.ageGroupPlt(self.year)


#Plot Window

class plotWin(tk.Toplevel):
    # Constructs the object inherited from Toplevel
    def __init__(self, master):
        super().__init__(master)

    # Uses EnrollData's plotEnrollTrend to plot total students
    def enrollTrendPlt(self):
        fig = plt.figure(figsize=(10,10))

        self.master.ed.plotEnrollTrend()

        canvas = FigureCanvasTkAgg(fig, master=self)       # create canvas
with figure that matplotlib used
        canvas.get_tk_widget().grid()                        # position
canvas
        canvas.draw()

    # Uses EnrollData's plotByAgeGroups to plot based on the year chosen
by user
    def ageGroupPlt(self, year):
        fig = plt.figure(figsize=(10,10))

        self.master.ed.plotByAgeGroups(year)

        canvas = FigureCanvasTkAgg(fig, master=self)
        canvas.get_tk_widget().grid()
        canvas.draw()

# File Exception Handling - Window tries to open file, displays error if
it can't find the file
# Exits the GUI if user clicks okay or X

class fileExceptWin ():
    # Calls showerror from tkmb
    def __init__(self):
        tkmb.showerror("Error", "Can't open: " + FILENAME + "\nCheck file
and try again", parent = None)



# MAIN FUNCTION - Creates the main window, checks for the file, and runs
the mainloop
def main():
    app = mainWin()
    app.mainloop()

main()


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DATA ANALYSIS ON STUDENTS2.CSV
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The enrollment trend graph shows a spike in the number of students in 2009
and the numbers have been decreasing since then.
While the number of students in the "19 or less" or "20-24" has been
consistent, there has been a descrease in students who are 30+ years old.
A possible reason for this increase and decrease in older students may be
due to the 2008-2009 recession in California. This could have caused the
older population to lose jobs and during their unemployment went to
school. Since the economy has grown since 2009,
the older population are more likely to find jobs which might deter them
from school.

'''
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