tkinter

Regular expressions
tkinter

portable GUI library for Python
Create the main window of an app

```python
#import tkinter
from tkinter import *

#create main window
window = Tk()
window.title("Canvas")

#add widgets

#enter the main event loop
window.mainloop()
```
Widgets – GUI elements

- canvas
- button
- checkbutton
- entry
- frame
- label
- listbox
- menu
- menubutton
- message
- radiobutton
- scale
- scrollerbar
- text
- toplevel
- spinbox
- panedwindow
- tkmessagebox
Canvas to draw shapes

from tkinter import *
from tkinter import font  # import font package

window = Tk()
window.title("Canvas")

area = Canvas(window, width=600, height=600, background="white")
area.grid()  # organizes widgets into a table-like structure

# one line (x0, y0, x1, y1)
area.create_line(30, 40, 300, 40)

# several lines
area.create_line(30, 60, 300, 60, 300, 100, 60, 100)

# change the width and color of the lines
area.create_line(30, 130, 300, 130, width=4, fill="red")

...
Canvas to draw shapes

... 

# rectangle
area.create_rectangle(30,260, 300,300)

# oval
area.create_oval(30,260, 300,300, width=2, outline="blue", fill="red")

# mouse over this oval
area.create_oval(330, 330, 400, 400, fill="gray", activefill="pink")

# dash lines connecting points and coloring the content
area.create_polygon(30,160, 300,160, 300,200, 60,200, fill="red")

# set font for the text
big_font = font.Font(family='Helvetica', size=32, weight='bold')
area.create_text(30, 500, text="Hi!", font=big_font, anchor=NW)

window.mainloop()
from tkinter import *

window = Tk()
window.title("Images")
area = Canvas(window, width=600, height=400, background="white")
area.grid()

# download image and place it in the canvas
ball = PhotoImage(file="ball.gif")
img = area.create_image(450, 80, image=ball)

# change image if mouse is above the image
closed = PhotoImage(file="closed.gif")
opened = PhotoImage(file="opened.gif")
img = area.create_image(50, 400, image=closed, activeimage=opened, anchor=NW)

window.mainloop()
Click and change position of the image

```python
from tkinter import *
from random import randint

window = Tk()
window.title("Juku")
area = Canvas(window, width=600, height=600, background="white")
area.grid()

def mouse_click_on_juku(event):
    new_x = randint(0, area_width-50)  # new x coordinate
    new_y = randint(0, area_height-50)  # new y coordinate
    area.coords(juku_id, new_x, new_y)

# download an image and place it in the canvas
juku = PhotoImage(file="juku.gif")
juku_id = area.create_image(100, 100, image=juku)

area.tag_bind(juku_id, '<1>', mouse_click_on_juku)

window.mainloop()
```
from tkinter import *

window = Tk()
window.title("Mouse clicks")
area = Canvas(window, width=600, height=600, background="white")
area.grid()

def register_mouse_click(event):
    print("The click was made on the position: ", event.x, event.y)

# <1> indicates the left mouse button
area.bind('<1>', register_mouse_click)

window.mainloop()
from tkinter import *
from tkinter import messagebox

window = Tk()
window.title("Say Hello")
window.geometry("300x100")  # window size

# label
labelName = Label(window, text="Name")
labelName.place(x=5, y=5)

# text field
name = Entry(window)
name.place(x=70, y=5, width=150)

# button; function sayHello is associated with a button
but = Button(window, text="Say Hello!", command=sayHello)
but.place(x=70, y=40, width=150)

window.mainloop()

def sayHello():
    say = 'Hello ' + name.get()
    messagebox.showinfo(message=say)
More examples

https://courses.cs.ut.ee/2018/nkp/fall/Main/Before13a
Regular expressions

- regex or regexp
- a language of “marker characters” - programming with characters
- matches strings of text used in search
Regular Expression Quick Guide

^   Matches the beginning of a line
$   Matches the end of the line
.   Matches any character
\s  Matches whitespace
\S  Matches any non-whitespace character
*   Repeats a character zero or more times
*?  Repeats a character zero or more times (non-greedy)
+   Repeats a character one or more times
+?  Repeats a character one or more times (non-greedy)
[aeiou] Matches a single character in the listed set
[^XYZ] Matches a single character not in the listed set
[a-z0-9] The set of characters can include a range
(   Indicates where string extraction is to start
)   Indicates where string extraction is to end

https://www.py4e.com/lectures3/Pythonlearn-11-Regex-Handout.txt
Examples

```python
import re

x = 'From: X- Using the: character. My 2 favorite numbers are 19 and 42.'

re.findall('^h', x)
re.findall('h.*:', x)
re.findall('[0-9]+', x)
re.findall(' \S+a\S\S', x)
re.findall('^F.+?:', x)
re.findall('^F+:', x)
re.findall('^From.*X-([^i]*)', x)
```
Homework (ship, find usernames)

Questions?
Test 13

Questions?
Exercises

https://courses.cs.ut.ee/2018/nkp/fall/Main/During13