



TKINTER LESSON

by GVOZA students ;)

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01

INTRODUCTION

CODE



#at the beginning of every
programme, the following lines are
needed to be written for your code
to be executed

```
import tkinter
```

```
canvas = tkinter.Canvas()  
canvas.pack()
```

#canvas is a variable name, so you
can choose a different one

... your code

Coordinate system

- in tkinter we use coordinate system to orientate on graphical area
- starting point is located in the upper left corner (its coordinates are $[0,0]$)

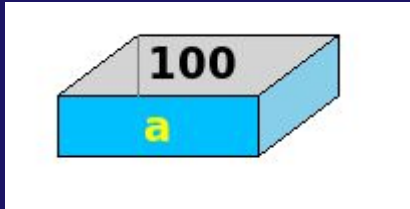


Have a look at the drawing window

- Dimensions
 - Coordinate x in $(0; 360>$
 - Coordinate y in $(0; 270>$
- Coordinate $[0; 0]$ is not used because the border lines of the rectangle would not be visible
- Nothing outside the drawing area is displayed, **be careful during calculations**



Variables



- variable in a python program stores data in the computer for processing.
- Variables in Python can be defined by any name or even letters like x, y, a, aa...



CODE

```
x = 30
```

```
Name = 'Dingel'
```

```
Number_of_pages = 130
```

```
#Variable can be used in a statement or  
expression, and its value will be  
substituted
```

```
print(x)
```

```
>>> 30
```

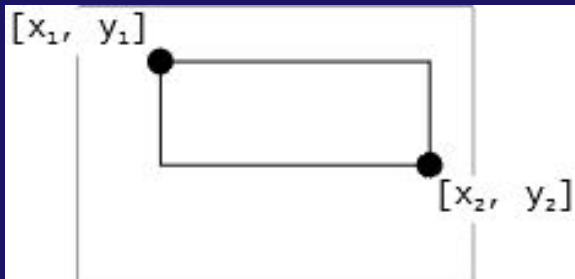




02

DRAWING RECTANGLES

How to draw a rectangle



- command for creating a rectangle is:
 - `canvas.create_rectangle(x1, y1, x2, y2)`
- x_1, y_1 are coordinates of the left upper vertex
- x_2, y_2 are coordinates of the right lower vertex

note: **Square is just a special case of rectangle!**



CODE

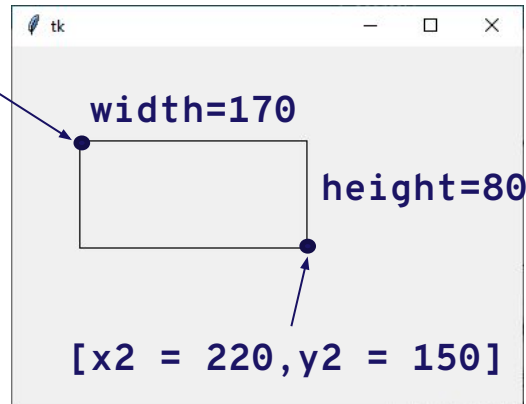
```
import tkinter

canvas = tkinter.Canvas()
canvas.pack()

canvas.create_rectangle(50, 70, 220, 150)
```



[x1 = 50, y1 = 70]





Task 1

Draw a square with size 50 px!

CODE



```
import tkinter
```

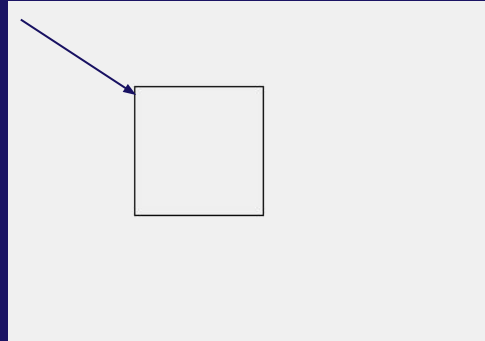
```
canvas = tkinter.Canvas()  
canvas.pack()
```

```
x= 100  
y= 70
```

```
canvas.create_rectangle(x , y , x+50, y+50)  
#x,y are numbers that you choose as your  
left upper vertex
```

Drawing a rectangle with variables

$x = 100, y = 70$



- you can use variables as coordinates
- the easiest way is to select the upper left corner or center point of the rectangle

Exercise

- draw a square with side 100
- the upper-left corner is specified by x, y

CODE

```
import tkinter

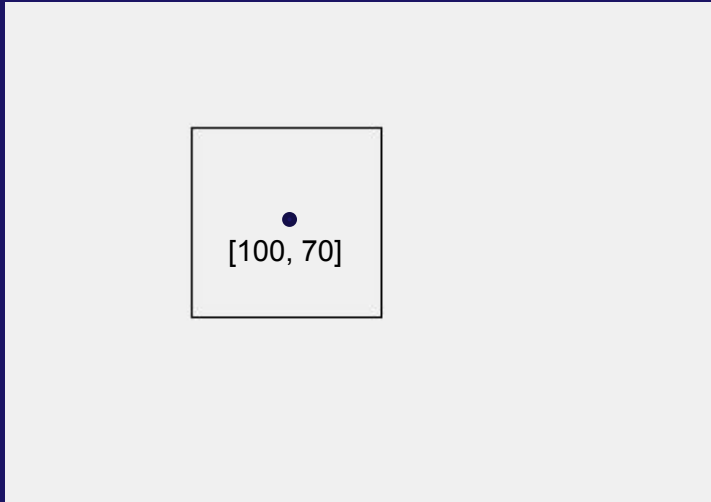
canvas = tkinter.Canvas()
canvas.pack()

x = 100
y = 70

canvas.create_rectangle(x, y, x+100, y+100)
```



Drawing a rectangle with variables



- draw a square with side 100
- the center of the rectangle is specified by x,y
- the result will be the same as in the last exercise, but the position of the square differs



CODE

```
import tkinter

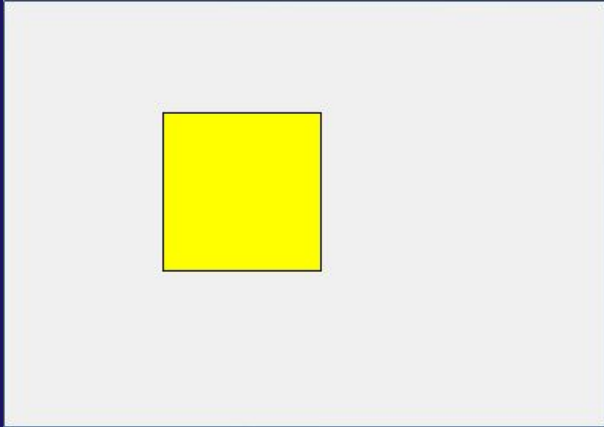
canvas = tkinter.Canvas()
canvas.pack()

x = 100
y = 70

canvas.create_rectangle(x-50,y-50,x+50,y+50)
```



Filling rectangle with color



color examples:

Blue	LightBlue	Cyan	SkyBlue	CornFlowerBlue	DeepSkyBlue	DodgerBlue
RoyalBlue	SlateBlue	SteelBlue	MediumBlue	Navy	Red	SandyBrown
Salmon	Coral	Tomato	Orange	DarkOrange	OrangeRed	IndianRed
Chocolate	Tan	Maroon	Sienna	Brown	SaddleBrown	Pink
Plum	Violet	Orchid	Magenta	Purple	DarkMagenta	Green
PaleGreen	YellowGreen	MediumSeaGreen	LawnGreen	LimeGreen	ForestGreen	DarkGreen
Yellow	Khaki	Gold	Gray	LightGray	Black	White

- now when you know how to create a rectangle, we can proceed to adjusting its properties such as color
- that's easily done by adding "fill" property after coordinates (e.g. `canvas.create_rectangle(x1, y1, x2, y2, fill = "color")`)



CODE

```
import tkinter
```

```
canvas = tkinter.Canvas()  
canvas.pack()
```

```
canvas.create_rectangle(30, 30, 130, 130,  
fill = 'yellow')
```

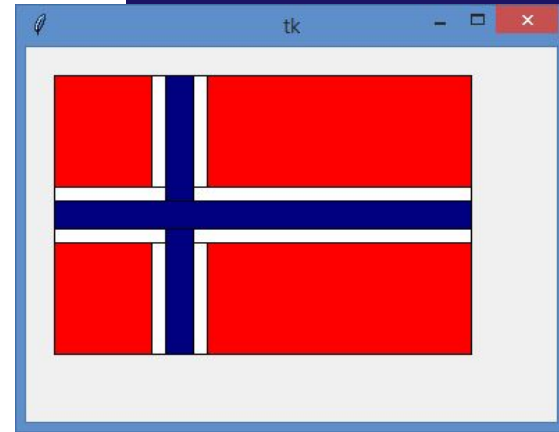
```
#you can replace 'yellow' with a different  
color, it can be green, blue, red or any  
color you want..
```





Task 2

Draw the flag of Norway. Use variables x , y . Before, you can start to train by writting commands for French flag.



Code for flag

```
import tkinter

canvas = tkinter.Canvas()
canvas.pack()

x = 20
y = 20
canvas.create_rectangle(x, y, x + 300, y +
200, fill = 'red')
canvas.create_rectangle(x + 70, y, x + 110,
y + 200, fill = 'white')
canvas.create_rectangle(x, y + 80, x + 300,
y + 120, fill = 'white')
canvas.create_rectangle(x + 80, y, x + 100,
y + 200, fill = 'navy')
canvas.create_rectangle(x, y + 90, x + 300,
y + 110, fill = 'navy')
```

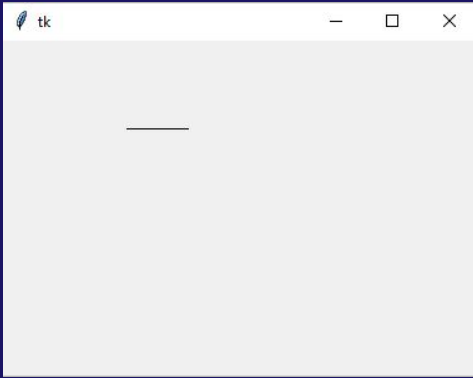




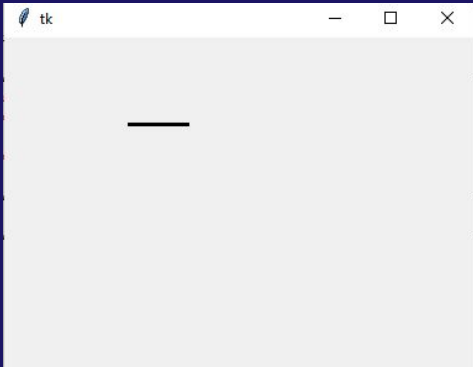
03

Drawing line and oval

Line width = 1



Line width = 3



How to draw a line

- Command for creating line is:
 - `canvas.create_line (x1,y1,x2,y2)`
- `x1, y1` are coordinates of the starting point
- `x2, y2` are coordinates of the final point
- default width of the line is 1
- You can change it by typing `width = value`
`canvas.create_line(x1,y1,x2,y2, width = 3)`



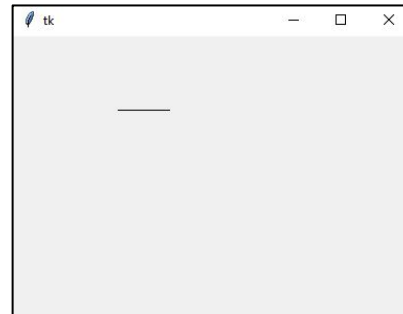
CODE

```
import tkinter

canvas=tkinter.Canvas()
canvas.pack()

x = 100
y = 70

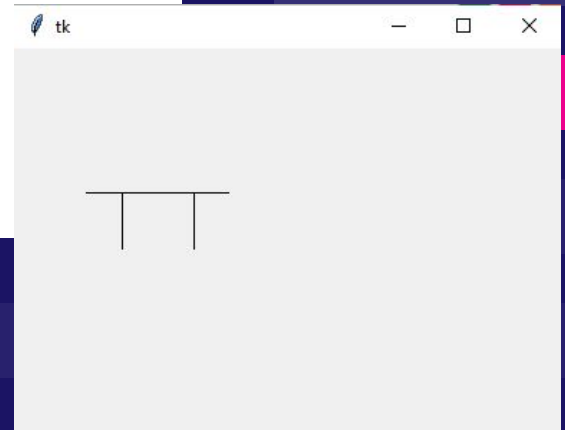
canvas.create_line(x,y,x+50,y)
```





Task 3

*Create table using lines
(something like this)*



CODE

```
import tkinter

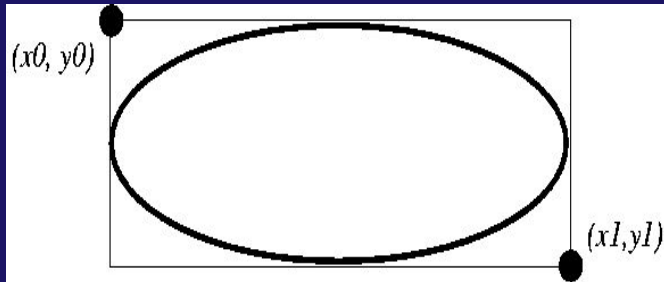
canvas=tkinter.Canvas()
canvas.pack()

x = 100
y = 100

canvas.create_line(x-50,y,x+50,y)
canvas.create_line(x-25,y,x-25,y+40)
canvas.create_line(x+25,y,x+25,y+40)
```



How to draw an oval



- command for creating an oval is:
 - `canvas.create_oval(x1, y1, x2, y2)`
- x_1, y_1 are coordinates of the left upper vertex of the rectangle circumscribed to circle
- x_2, y_2 are coordinates of the right lower vertex of the circumscribed rectangle

Note: **circle is just a special case of the oval!!**

CODE

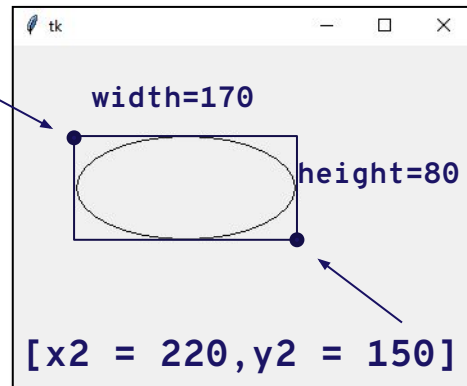


```
import tkinter
```

```
canvas = tkinter.Canvas()  
canvas.pack()
```

```
canvas.create_oval(50, 70, 220, 150)
```

[x1 = 50, y1 = 70]



[x2 = 220, y2 = 150]



Task 4

*Draw an oval 50 px high and
100 px wide!*

CODE



```
import tkinter
```

```
canvas = tkinter.Canvas()  
canvas.pack()
```

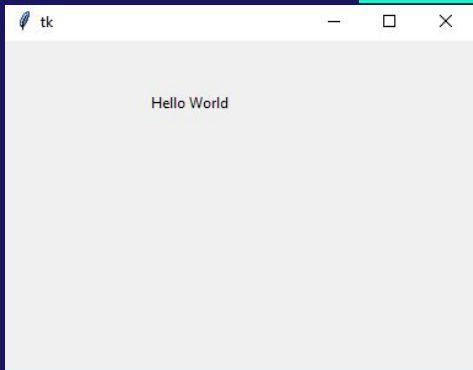
```
x= 50  
y= 50
```

```
canvas.create_oval(x ,y , x+100, y+50)  
#x,y in your solution can differ – they are  
numbers that you choose as your left upper  
vertex
```



04

CREATING TEXT



Creating text

- text is created by the command:
 - `canvas.create_text(x,y, text = "Hello World")`
 - in this case `x, y` are coordinates of the center point of the text
- you can also change the font of the text, the only thing you have to do is to write `font = 'Arial n'` where `n` is the size of the text

CODE

```
import tkinter

canvas = tkinter.Canvas()
canvas.pack()

canvas.create_text(150, 50, text = 'Hello
World', font='Arial 50')
```

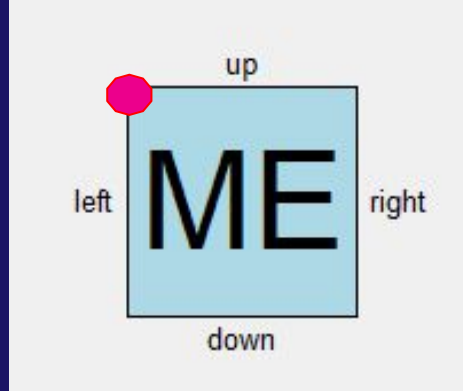




Task 5

Draw this ME logo!





How to make ME logo

- First of all we choose x and y in the upper left corner of the square
 - $x = n$ n, m - numbers that you choose
 - $y = m$
 - `canvas.create_rectangle(x, y, x+a, y+a, fill="color")`
 - `canvas.create_text(x+n, y+n, text="left/up/down/right/M/E", font=arial *n*)`

CODE

```
import tkinter
canvas=tkinter.Canvas()
canvas.pack()
x=135
y=90
canvas.create_rectangle(x,y,x+100,y+100,fill="lightblue")
canvas.create_text(x+50,y-10,text="up",font="arial 10")
canvas.create_text(x+50,y+110,text="down",font="arial 10")
canvas.create_text(x-15,y+50,text="left",font="arial 10")
canvas.create_text(x+118,y+50,text="right",font="arial 10")
canvas.create_text(x+30,y+50,text="M",font="arial 45")
canvas.create_text(x+75,y+50,text="E",font="arial 45")
```

#you can replace 'lightblue' with a different color, it can be green, yellow, red or any color you want..

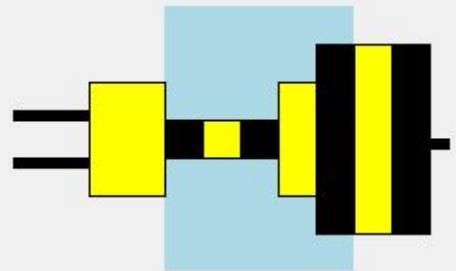




Difficult task:

Draw the picture using the center points!

hint: code "width=0" removes the outlines





05

Function

Define and call a function

```
def square_example():  
    x = 100  
    y = 50  
    canvas.create_rectangle(x,y,x + 50,y + 50, fill = 'red')
```

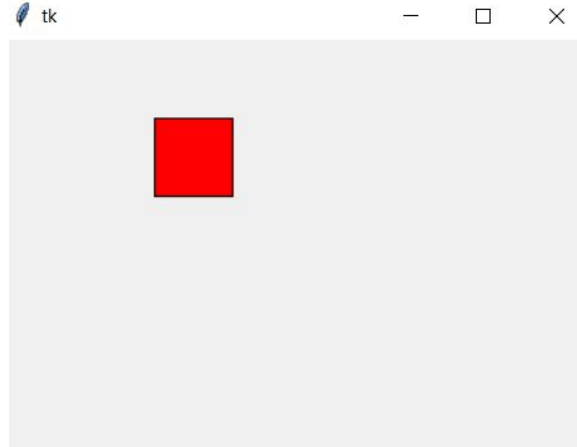
- word **def** begins the definition of your new command - function
- **square_example** is the name of the function
- the next lines form **the body** of the function
- in order for the function to execute a group of commands, you must type in the command line: `square_example()`
- **blank brackets** are important !!!

CODE

```
import tkinter
canvas = tkinter.Canvas()
canvas.pack()

def square_example():
    x = 100
    y = 50
    canvas.create_rectangle(x,y,x + 50,y + 50,
        fill = ('red'))
```

```
square_example()
```





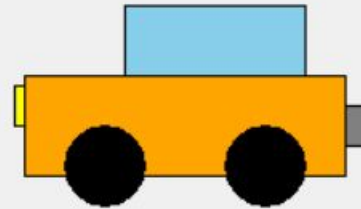
Task 6:

Draw this picture using a
function `car_model!`

hint:

Use central point coordinates:

$x = 200, y = 150$



CODE



```
import tkinter

canvas = tkinter.Canvas()
canvas.pack()

def car_model():
    x = 200
    y = 150
    canvas.create_rectangle(x - 80, y - 25, x + 80, y +
25, fill = 'orange')
    canvas.create_oval(x - 60, y, x - 20, y + 40, fill =
'black')
    canvas.create_oval(x + 20, y, x + 60, y + 40, fill =
'black')
    canvas.create_rectangle(x - 30, y - 60, x + 60, y -
25, fill = 'skyblue')
    canvas.create_rectangle(x - 85, y - 20, x - 80, y, fill
= 'yellow')
    canvas.create_rectangle(x + 80, y - 10, x + 90, y +
10, fill = 'grey')

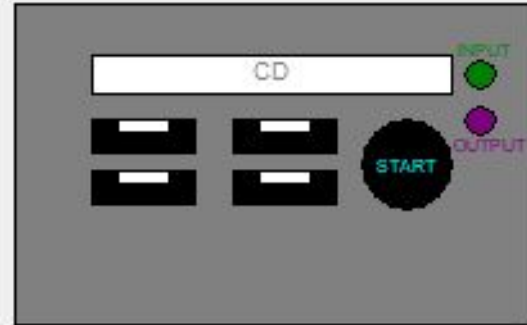
car_model()
```



Task with multiple functions:

Write a code that draws a PC with Start button, multiple ports, PC box and CD rom (include texts like CD, INPUT, OUTPUT, START) using functions.

It should look like this



CODE

Following this code should bring you the same result (try to play with it to get familiar with the system):

```
import tkinter
c=tkinter.Canvas()
c.pack()

x=185
y=135
def CD():
    c.create_rectangle(x-70,y-105,x+70,y-90,fill='white')
    c.create_text(x,y-98,text='CD',font='arial 7',fill='grey')

def PC_box():
    c.create_rectangle(x-100,y-125,x+100,y,fill='grey')

def ports():
    c.create_rectangle(x-70,y-80,x-30,y-67,fill='black')
    c.create_rectangle(x-70,y-60,x-30,y-47,fill='black')
    c.create_rectangle(x-15,y-80,x+25,y-67,fill='black')
    c.create_rectangle(x-15,y-60,x+25,y-47,fill='black')
    c.create_rectangle(x-60,y-80,x-40,y-75,fill='white')
    c.create_rectangle(x-60,y-60,x-40,y-55,fill='white')
    c.create_rectangle(x-5,y-80,x+15,y-75,fill='white')
    c.create_rectangle(x-5,y-60,x+15,y-55,fill='white')
```

Rest is on the other slide



CODE



```
c.create_oval(x+75,y-103,x+87,y-92,fill='green')
c.create_oval(x+75,y-85,x+87,y-74,fill='purple')
c.create_text(x+82,y-107,text='INPUT',fill='green',font='arial 5')
c.create_text(x+85,y-70,text='OUTPUT',fill='purple',font='arial 5')

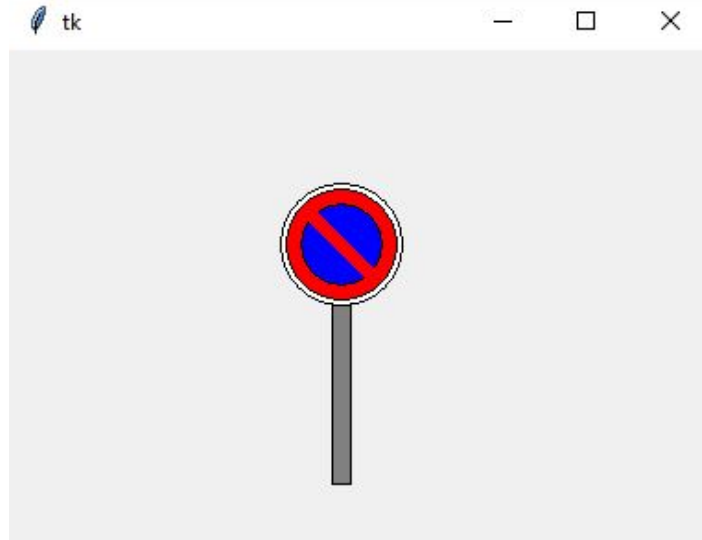
def START():
    c.create_oval(x+35,y-80,x+70,y-45,fill='black')
    c.create_text(x+52,y-62,text='START',font='arial 5',fill='cyan')

def PC():
    PC_box()
    CD()
    ports()
    START()

PC()
```

Final task: Road sign

Create this road sign, use variables x and y , which are the coordinates of the center of the pole.

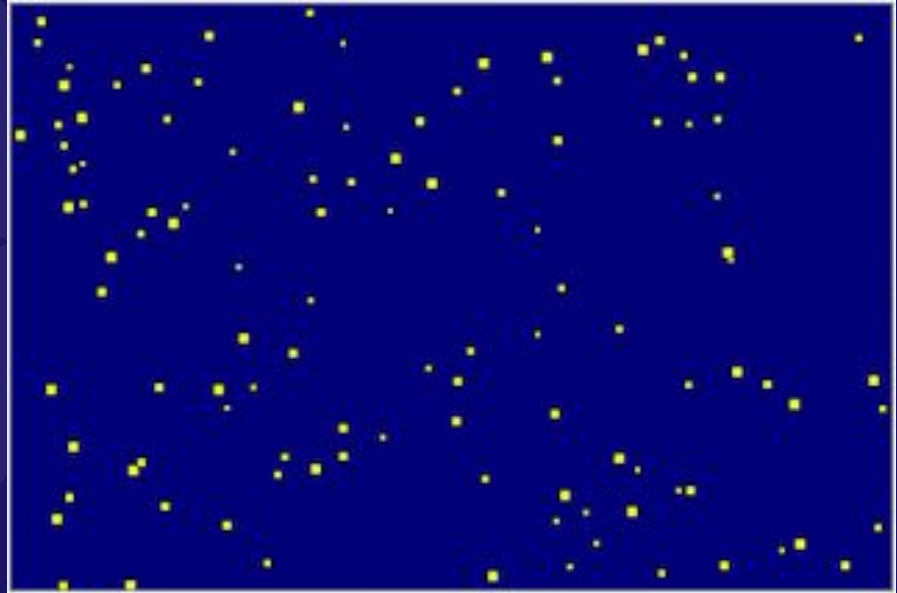


CODE



```
import tkinter
canvas=tkinter.Canvas()
canvas.pack()
def road_sign():
    x=180
    y=185
    canvas.create_rectangle(x-5,y-50,x+5,y+
50,fill='grey')
    canvas.create_oval(x-33,y-47,x+33,y-113
,fill='white')
    canvas.create_oval(x-30,y-50,x+30,y-110
,fill='red')
    canvas.create_oval(x-22,y-58,x+22,y-102
,fill='blue')
    canvas.create_line(x-20,y-100,x+20,y-60
,fill='red',width=7)
road_sign()
```

In tkinter you can do
this too



Following this code



```
import random
import tkinter
canvas=tkinter.Canvas(bg='navy',width=600,height=400)
canvas.pack()

def obloha():
    x=random.randint(5,595)
    y=random.randint(5,395)
    a=random.randint(1,4)
    canvas.create_rectangle(x,y,x+3+a,y+3+a,fill='yellow')

for i in range(1000):
    obloha()
    canvas.after(20)
    canvas.update()
```

Finally...



```
x=5
while True:
    print(x)

#wait till end
```

...small joke for you,
guys.



now your computer is burning

HAHAA PRANK

don't do this if you don't want
your computer to burn

**THANK YOU
FOR YOUR
ATTENTION**

:)

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