GUI IN PYTHON

GUI-GRAPHICAL USER INTERFACE

1)it is user friendly

2) it adds attraction and beauty to any application by adding pictures ,colors menus

3) it is possible to simulate the real life objects using GUI.

Python provides various options for developing graphical user interfaces (GUIs). Most important are listed below.

- **Tkinter** – Tkinter is the Python interface to the Tk GUI toolkit shipped with Python. We would look this option in this chapter.
- **wxPython** – This is an open-source Python interface for wxWindows http://wxpython.org.
- **JPython** – JPython is a Python port for Java which gives Python scripts seamless access to Java class libraries on the local machine http://www.jython.org

Python offers multiple options for developing GUI (Graphical User Interface). Out of all the GUI methods, tkinter is the most commonly used method. It is a standard Python interface to the Tk GUI toolkit shipped with Python. Python with tkinter is the fastest and easiest way to create the GUI applications. Creating a GUI using tkinter is an easy task.

To create a tkinter app:

1. Importing the module – tkinter
2. Create the main window (container)
3. Add any number of widgets to the main window
4. Apply the event Trigger on the widgets.

Following are the general steps involved in basic GUI programs:

1) First of all we should create the root window. the root window is top level window that provides rectangular space on the screen where we can display text ,color ,images etc
2) In the root window we have to allocate space for our use. this is done by creating a canvas or frame so canvas and frame are child window on root
3) Generally we use canvas for displaying drawing like lines ,arcs,circles ,shapes etc we use frame for the purpose of displaying componets like push buttons,check,buttons ,menus etc.these components are also called 'widgets'
4) When the user clicks on widget like push button ,we have to handle that event .it means we have to respond to the events by performing the desired tasks.

Prog 1: simple GUIT program

```
# import all components from tkinter

from tkinter import *

root=Tk() # create the root window

# wait and watch for any event that may take place in the root window

root.mainloop()
```

mainloop() tells Python to run the Tkinter **event loop**. This method listens for events, such as button clicks or keypresses, and blocks any code that comes after it from running until you close the window where you called the method

we can give name to window as

root.title("name of window")

prog 2: python program to create root window add name

```
from tkinter import *

root=Tk()

root.title("my window")

root.mainloop()
```

we can set default size to root window

root.geometry("700x850")

we give background color to the root window

root.configure(bg='yellow')

Working with containers:

A container is component which is used as a place where drawing or widgets can be displayed .container is space that display the output to the user.

1) Canvas: this is conatiner that is generally used to draw shapes lines,curves,arcs and circles
2) Frame : used to display widgets like button,check button,menus,radio button

Canvas: is a rectangular area which can be used for drawing lines,curves

c=Canvas(root,bg="red",height=500,width=200,cursor='pencil')

c.pack()

where c is object of Canvas class

root is parent window

bg is background color

height and width of canvas

cursor is shape of cursor on canvas

ex : arrow,box_spiral,circle,cross etc……..

once canvas is created it should be added to the root window .then only it will be visible .this is done using the pack() method

c.pack()

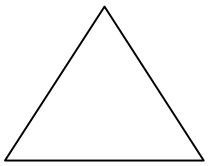
after canvas is created we can draw any shapes on the canvas

c.create_line(100,100,200,300)

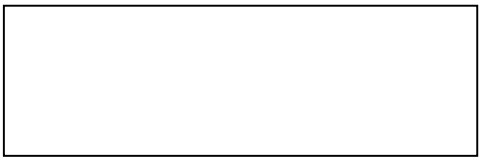
c.create_line(50,50,200,50,200,150,width=5,fill="blue")

c.create_oval(50,50,400,300,width=5,fill="yellow",outline="pink",activefill="green")

c.create_polygon(10,10,200,200,300,200,width=5,fill="green",activefill="yellow",smooth=1)

150,50,80,150,180,150 

c.create_rectangle(50,50,200,200,width=2,fill="grey",activefill="yellow")



50,50,200,150 

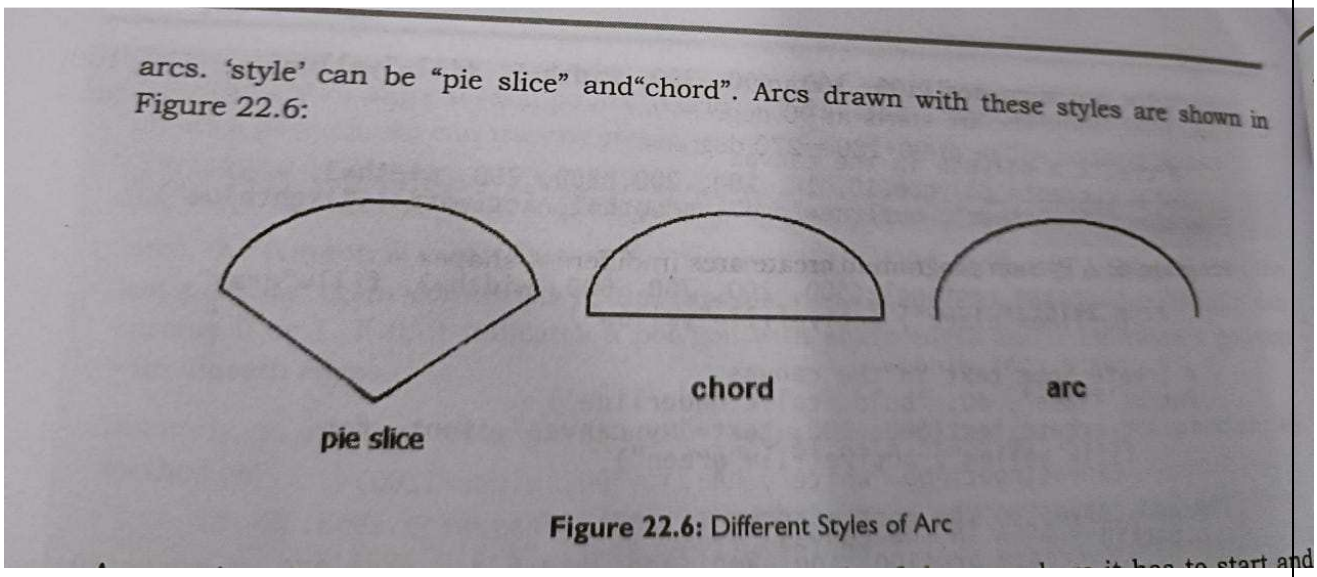
50,50,200,200

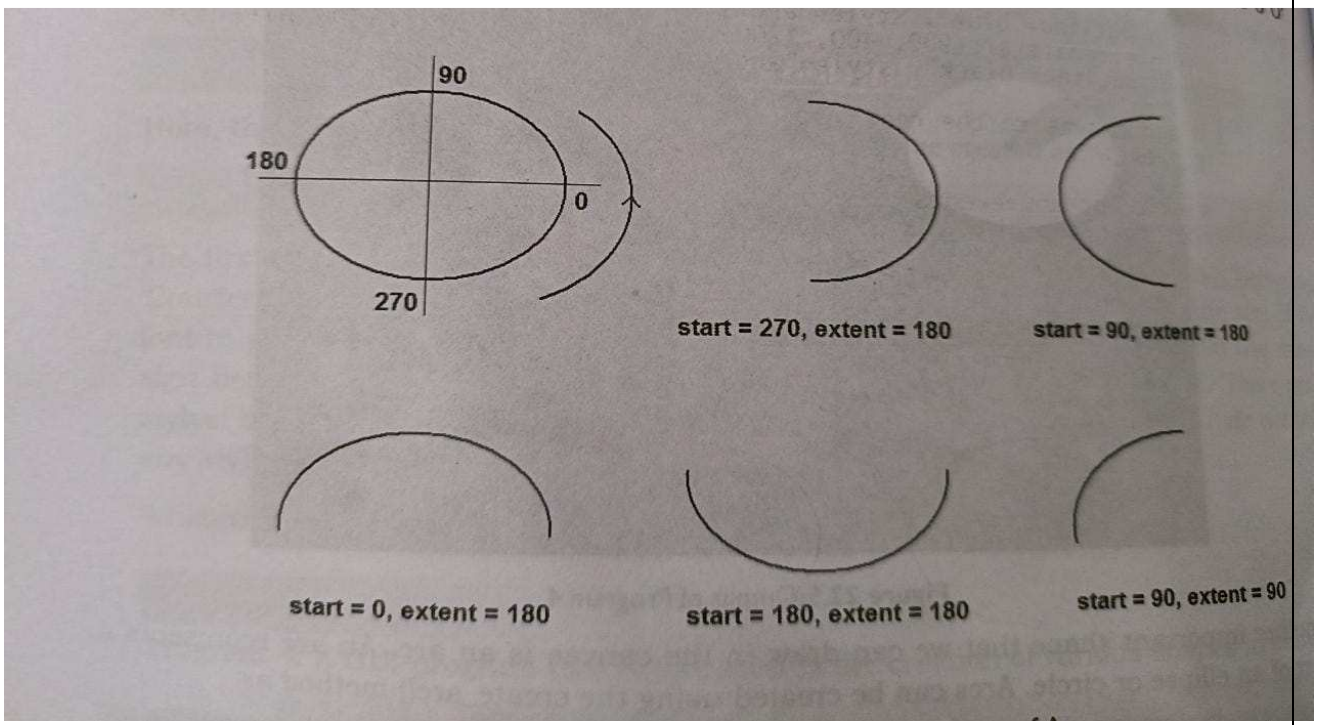
fnt=('Times',40,"bold")

c.create_text(400,50,text="Dipali",font=fnt,fill="yellow",activefill="pink")

c.create_arc(100,100,400,300,width=3, sart=270, extent=180, outline="yellow")

where start is arc will start at an angle=270 and extend for another 180 degree





```
from tkinter import *
root=Tk()
root.title("My Window")
root.geometry("500x500")
root.configure(bg="yellow")
c=Canvas(root,bg="red",height=400,width=400,cursor='diamond_cr
oss')
c.pack()
f=("Times",50,"bold","underline","italic")
c.create_text(80,80,text="GPM",fill="yellow",font=f)
root.mainloop()
```

Frame:

root window is a frame.

f=Frame(root,height=800,width=700,bg=”yellow”,cursor=”cross”)

f.pack()

widgets:

1) Button

2)label

3) Message

4)Text

5)scrollbar

6)Checkbutton

7)Radiobutton

8)Entry

9)Spinbox

10)listbox

11)Menu

step1: create widgets on frame.

b=Button(f,text=”submit”)

b.pack()

b1=Button(f,text=”cancle”)

b1.pack()

step 2:when the user interact with widgets he will generate event(function). “event handlers”

```
def buttonclick(self):
    print(“welcome to Python programming”)
def canclebutton(self):
    print(“BYE BYE”)
```

3. Step 3:

```
b.bind(‘<Button-1>’,buttonclick)
b1.bind(‘<Button-1>’,canclebutton)
```

Step 4:

```
root.mainloop()
```

f.propagate(0)- frame will not shrink .

f.propagate()- will shrink window.

Arranging Widgets in the frame:

1) Pack layout

2)Grid layout

3)Place layout

b.pack(fill=x)

fill will take X,Y,BOTH,NONE

X=horizontally

Y=Vertically

BOTH

b.pack(side=LEFT)

side=LEFT,RIGHT,TOP,BOTTOM

Arranging Widgets In The Frame:

1)Pack Layout

2) Grid Layout

3)place layout

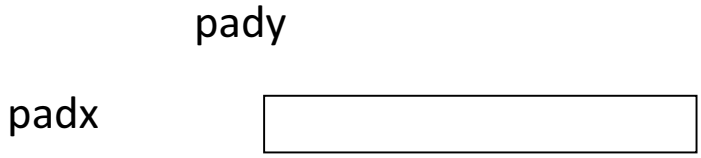
Pack layout

b.pack(fill=X)

we can use fill as X,Y,BOTH,NONE

by default it is NONE

also we can use padx,pady options that represents how much space should be left around the components horizontally and vertically.



Pack method can take another option as side

b.pack(side=LEFT)

side can be LEFT,RIGHT,BOTTOM,TOP

by default is TOP

Grid Layout

Uses grid method to arrange the widgets in a two dimensional table that contains rows and columns. position of widget can defined by row and column.

	sumit	cancle	
			reset

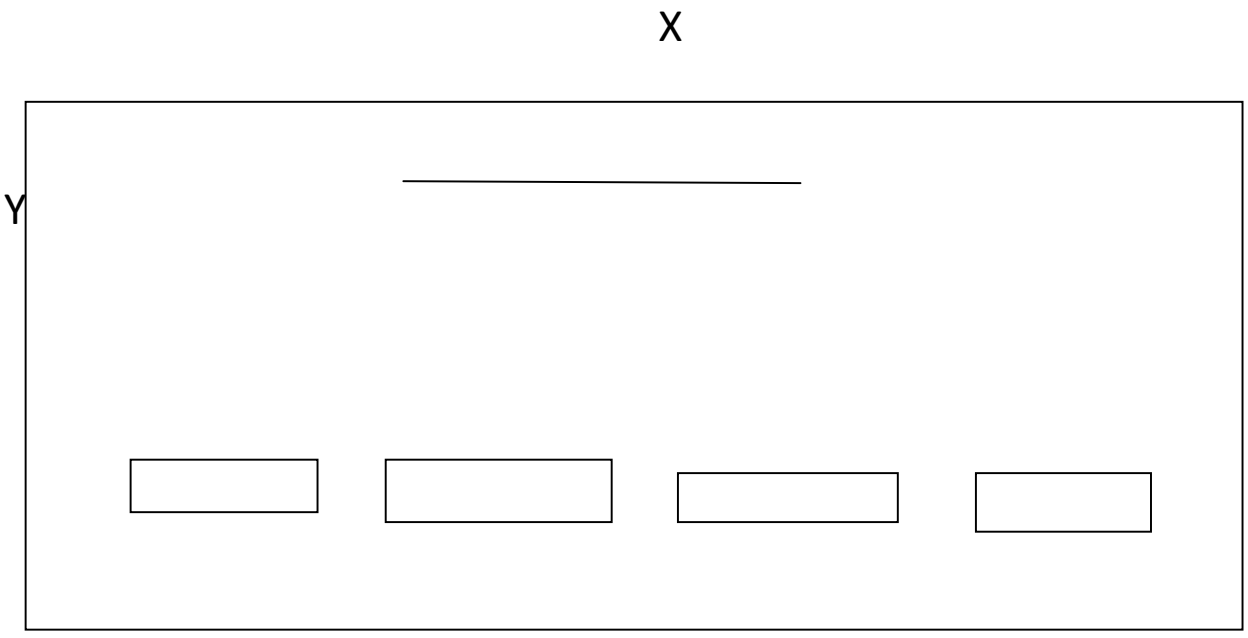
b.grid(row=3,column=2)

b1.grid(row=3,column=3)

b2.grid(row=4,column=4)

Place layout:

The place layout manager uses x and y coordinates along with height and width of frame



Label :a label represents constant text that is displayed in the frame or container . a label can be displayed one or more line of text cannot be modified . a label is created as an object of label class

```
l=Label(f,text="WELCOME TO PYTHON",fg="red",bg="yellow")
l.place(x=100,y=50)
```

Message:

A message is similar to label but message is generally used to display multiple lines of text where label is used for single line.

```
M=Message(f,text="aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa")
m.place(x=10,y=10)
```

1) ENTRY WIDGET

```
from tkinter import *
root=Tk()
f=Frame(root,width=800,height=500)
f.pack()
l=Label(f,text="Name")
l.place(x=20,y=100)
e1=Entry(f,width=25,bg="red",fg="yellow",font=('arial',20,'bold'),
show='*')
e1.place(x=70,y=100)
root.mainloop()
```

2) entry widget program

```
from tkinter import *
root=Tk()
f=Frame(root,width=800,height=500)
f.pack()
def show(e):
    s1=e1.get()
    s2=e2.get()
    l2=Label(f,text="Username is"+s1)
    l2.place(x=50,y=400)
    l3=Label(f,text="PAssword"+s2)
```

```
    l3.place(x=50,y=440)


l=Label(f,text="Enter Username")
l.place(x=20,y=100)
l1=Label(f,text="Enter Password")
l1.place(x=20,y=200)
e1=Entry(f,width=25,bg="red",fg="yellow",font=('arial',10,'bold'))
e1.place(x=110,y=100)
e2=Entry(f,width=25,bg="red",fg="yellow",show="*")
e2.place(x=110,y=200)
b=Button(f,text="SUBMIT")
b.place(x=50,y=300)
b.bind("<Button-1>",show)
root.mainloop()
```

3) program of spinbox

```
from tkinter import *
root=Tk()
f=Frame(root,width=800,height=500)
f.pack()
l=Label(f,text="SELECT DATE")
l.place(x=50,y=100)
l1=Label(f,text="SELECT CITY")
```

```
l1.place(x=50,y=150)
def show(e):
    v=str(var1.get())
    v2=var2.get()
    l1=Label(f,text="you have selected "+v+"number")
    l1.place(x=300,y=300)
    l2=Label(f,text="you have selected"+v2+"city")
    l2.place(x=300,y=350)
var1=IntVar()
var2=StringVar()
s1=Spinbox(f,from_=
1,to=31,fg="red",bg="yellow",font=("arial",15,"bold"),textvariable
=var1)
s1.place(x=220,y=100)
s2=Spinbox(f,values=("MUMBAI","PUNE","SANGLI","NAGPUR","S
OLAPUR","KOLHAPUR"),textvariable=var2,fg="red",bg="yellow",f
ont=("times",10,"bold"))
s2.place(x=220,y=150)
b=Button(f,text="SUBMIT")
b.place(x=50,y=300)
b.bind("<Button-1>",show)
root.mainloop()
```

4) program of listbox

```
from tkinter import *
root=Tk()
f=Frame(root,width=800,height=500)
f.pack()
l1=Label(f,text="SELECT CITY")
l1.place(x=50,y=150)
def show(e):
    lst=[]
    s=lb.curselection()
    for i in s:
        lst.append(lb.get(i))
    print(lst)


lb=Listbox(f,fg="red",bg="pink",font=('times',20,'bold'),selectmode=MULTIPLE)
lb.place(x=150,y=150)
lb.insert(0,"mumbai")
lb.insert(1,"pune")
lb.insert(2,"sangli")
lb.insert(3,"nagpur")
```

```
lb.insert(4,"kolhapur")


b=Button(f,text="SUBMIT")
b.place(x=50,y=300)
b.bind("<Button-1>",show)
root.mainloop()
```

1) Pack program

```
from tkinter import *
root=Tk()
f=Frame(root,height=500,width=500,bg="pink")
f.propagate(0)
b=Button(f,text="SUBMIT")
b.pack(fill=BOTH)
b1=Button(f,text="RESET")
b1.pack(fill=BOTH)
b2=Button(f,text="CANCLE")
b2.pack(fill=BOTH)
f.pack()
root.mainloop()
```

2) pack method with fill option

```
from tkinter import *
root=Tk()
f=Frame(root,height=500,width=500,bg="pink")
f.propagate(0)
b=Button(f,text="SUBMIT")
b.pack(fill=X)
b1=Button(f,text="RESET")
b1.pack(fill=X)
b2=Button(f,text="CANCLE")
b2.pack(fill=X)
f.pack()
root.mainloop()
```

3) pack method with padding options

```
from tkinter import *
root=Tk()
f=Frame(root,height=500,width=500,bg="pink")
f.propagate(0)
b=Button(f,text="SUBMIT")
b.pack(fill=X,padx=100,pady=20)
b1=Button(f,text="RESET")
b1.pack(fill=X,padx=100,pady=50)
b2=Button(f,text="CANCLE")
b2.pack(fill=X,padx=100,pady=80)
f.pack()
root.mainloop()
```

4) pack with side option

```
from tkinter import *
root=Tk()
f=Frame(root,height=500,width=500,bg="pink")
f.propagate(0)
b=Button(f,text="SUBMIT")
b.pack(side=LEFT)
b1=Button(f,text="RESET")
b1.pack(side=RIGHT)
```

```
b2=Button(f,text="CANCLE")
b2.pack(side=TOP)
b3=Button(f,text="HOLD")
b3.pack(side=BOTTOM)
f.pack()
root.mainloop()
```

5) pack method with side option and padding

```
from tkinter import *
root=Tk()
f=Frame(root,height=500,width=500,bg="pink")
f.propagate(0)
b=Button(f,text="SUBMIT")
b.pack(side=LEFT,padx=50,pady=50)
b1=Button(f,text="RESET")
b1.pack(side=RIGHT,padx=50,pady=80)
b2=Button(f,text="CANCLE")
b2.pack(side=TOP,padx=50,pady=120)
b3=Button(f,text="HOLD")
b3.pack(side=BOTTOM,pady=10)
f.pack()
root.mainloop()
```

6) grid method

```
from tkinter import *
root=Tk()
f=Frame(root,height=800,width=800,bg="yellow")
f.pack()
b=Button(f,text="submit")
b.grid(row=1,column=1)
b1=Button(f,text="submit")
b1.grid(row=2,column=2)
b2=Button(f,text="submit")
b2.grid(row=3,column=3)
b3=Button(f,text="submit")
b3.grid(row=4,column=4)

root.mainloop()
```

7) grid method with padding

```
from tkinter import *
root=Tk()
f=Frame(root,height=800,width=800,bg="yellow")
f.pack()
b=Button(f,text="submit")
b.grid(row=1,column=1,padx=10,pady=10)
```

```
b1=Button(f,text="submit")
b1.grid(row=2,column=2)
b2=Button(f,text="submit")
b2.grid(row=3,column=3)
b3=Button(f,text="submit")
b3.grid(row=4,column=4)

root.mainloop()
```

8) place method

```
from tkinter import *
root=Tk()
f=Frame(root,height=800,width=800,bg="yellow")
f.pack()
b=Button(f,text="submit")
b.place(x=50,y=50)
b1=Button(f,text="submit")
b1.place(x=100,y=200)
b2=Button(f,text="submit")
b2.place(x=200,y=300)
b3=Button(f,text="submit")
b3.place(x=500,y=500)
```

```
root.mainloop()
```

9) Program to change background color with button change.

```
from tkinter import *
root=Tk()
f=Frame(root,height=800,width=800,bg="yellow")
f.pack()
b=Button(f,text="red",command=lambda:buttonclick(1))
b.place(x=50,y=50)
b1=Button(f,text="pink",command=lambda:buttonclick(2))
b1.place(x=100,y=200)
b2=Button(f,text="purple",command=lambda:buttonclick(3))
b2.place(x=200,y=300)
b3=Button(f,text="green",command=lambda:buttonclick(4))
b3.place(x=500,y=500)
def buttonclick(num):
   if num==1:
      f["bg"]="red"
   if num==2:
      f["bg"]="pink"
```

```
    if num==3:
        f["bg"]="purple"
    if num==4:
        f["bg"]="green"

root.mainloop()
```

10.GUI program for Text Widget

```
from tkinter import *
root=Tk()
f=Frame(root,height=800,width=800,bg="pink")
t=Text(f,width=30,height=20,font=('verdana',14,'bold'),fg='blue',bg='yellow',
wrap=WORD)
t.insert(END,"Government Polytechnic Mumbai is an academically
autonomous institute of Government of Maharashtra established in 1960, one
of the oldest and prestigious institute in Mumbai region and in the state of
Maharashtra. Institute got academic autonomy in the year 1994.")
t.place(x=50,y=20)
f.pack()
root.mainloop()
```

GUI PROGRAM FOR TEXT WIDGET TO ADD NEW CONTENT

```
from tkinter import *
root=Tk()
f=Frame(root,height=800,width=800,bg="pink")
```

```
t=Text(f,width=30,height=20,font=('verdana',14,'bold'),fg='blue',bg='yellow',
wrap=WORD)

t.insert(END,"Government Polytechnic Mumbai is an academically
autonomous institute of Government of Maharashtra established in 1960, one
of the oldest and prestigious institute in Mumbai region and in the state of
Maharashtra. Institute got academic autonomy in the year 1994.")

t.insert(END,"\nInstitute Had undertaken various Projects like World Bank
Assisted Project, Canada India Industry Institute Linkage Project, Technical
Education Quality Improvement Program Phase II, etc. Institute has very good
liaison with industries.")

t.place(x=50,y=20)

f.pack()

root.mainloop()
```

11.GUI PROGRAM FOR EDITING PERTICULAR TEXT FROM MULTILINE

```
from tkinter import *

root=Tk()

f=Frame(root,height=800,width=800,bg="pink")

t=Text(f,width=30,height=20,font=('verdana',14,'bold'),fg='blue',bg='yellow',
wrap=WORD)

t.insert(END,"Government Polytechnic Mumbai is an academically
autonomous institute of Government of Maharashtra established in 1960, one
of the oldest and prestigious institute in Mumbai region and in the state of
Maharashtra. Institute got academic autonomy in the year 1994.")

t.insert(END,"\nInstitute Had undertaken various Projects like World Bank
Assisted Project, Canada India Industry Institute Linkage Project, Technical
```

Education Quality Improvement Program Phase II, etc. Institute has very good liaison with industries.")

t.place(x=50,y=20)

t.tag_add('start','1.0','1.15')

t.tag_config('start',background="red",foreground="purple",font=("times",18,'bold','underline'))

f.pack()

root.mainloop()

12.GUI PROGRAM FOR SCROLLBAR

```
from tkinter import *

root=Tk()

f=Frame(root,height=800,width=800,bg="pink")

t=Text(f,width=30,height=10,font=('verdana',14,'bold'),fg='blue',bg='yellow',wrap=WORD)

t.insert(END,"Government Polytechnic Mumbai is an academically autonomous institute of Government of Maharashtra established in 1960, one of the oldest and prestigious institute in Mumbai region and in the state of Maharashtra. Institute got academic autonomy in the year 1994.")

t.insert(END,"\nInstitute Had undertaken various Projects like World Bank Assisted Project, Canada India Industry Institute Linkage Project, Technical Education Quality Improvement Program Phase II, etc. Institute has very good liaison with industries.")

t.place(x=50,y=20)

t.tag_add('start','1.0','1.15')
```

```
t.tag_config('start',background="red",foreground="purple",font=("times",18,'bold','underline'))
f.pack()
s=Scrollbar(f,orient=VERTICAL,command=t.yview)
t.configure(yscrollcommand=s.set)
root.mainloop()
```

13.GUI PROGRAM FOR SCROLLBAR

```
from tkinter import *
root=Tk()
s=Scrollbar(root)
s.pack(side=RIGHT,fill=Y)
s1=Scrollbar(root)
s1.pack(side=BOTTOM,fill=X)
root.mainloop()
```

14.CHECKBUTTON

```
from tkinter import *
root=Tk()
f=Frame(root,width=800,height=500,bg="pink")
f.pack()
c=Checkbutton(f,text="PYTHON")
```

```
c.place(x=50,y=100)
c1=Checkbutton(f,text="JAVA")
c1.place(x=200,y=100)
c2=Checkbutton(f,text="OS")
c2.place(x=350,y=100)
c3=Checkbutton(f,text="CN")
c3.place(x=450,y=100)
c4=Checkbutton(f,text="MM")
c4.place(x=550,y=100)
root.mainloop()
```

15.check button program 2 to handle event

```
from tkinter import *
root=Tk()
f=Frame(root,width=800,height=700,bg="pink")
f.pack()
def click(s):
   x=v1.get()
   print(x)
   y=v2.get()
   z=v3.get()
   a=v4.get()
```

```
    b=v5.get()
    str="you have selected following options:\n"
    if x==1:
        str+="PYTHON"
    if y==1:
        str+="\nJAVA"
    if z==1:
        str+="\nOS"
    if a==1:
        str+="\n CN"
    if b==1:
        str+="\n MM"
    #print("you have selected following optons:",str)
    l=Label(f,text=str,fg="green",bg="red")
    l.place(x=100,y=250)

v1=IntVar()
v2=IntVar()
v3=IntVar()
v4=IntVar()
v5=IntVar()
c=Checkbutton(f,text="PYTHON",variable=v1)
```

```
c.place(x=50,y=100)
c1=Checkbutton(f,text="JAVA",variable=v2)
c1.place(x=200,y=100)
c2=Checkbutton(f,text="OS",variable=v3)
c2.place(x=350,y=100)
c3=Checkbutton(f,text="CN",variable=v4)
c3.place(x=450,y=100)
c4=Checkbutton(f,text="MM",variable=v5)
c4.place(x=550,y=100)
b=Button(f,text="SUBMIT")
b.place(x=350,y=200)
b.bind("<Button-1>",click)
root.mainloop()
```

16 Radiobutton

```
from tkinter import *
root=Tk()
f=Frame(root,width=500,height=500,bg="pink")
f.pack()
l=Label(f,text="SELECT BRANCH",fg="green")
l.place(x=100,y=50)
var=IntVar()
```

```
def click(s):
    str="you have selected"
    x=var.get()
    if x==1:
        str+="IT"
    if x==2:
        str+="COMP"
    if x==3:
        str+="CIVIL"
    if x==4:
        str+="MECH"
    if x==5:
        str+="IS"
    ll=Label(f,text=str)
    ll.place(x=200,y=400)



r1=Radiobutton(f,text="IT",variable=var,value=1)
r1.place(x=50,y=150)
r2=Radiobutton(f,text="COMP",variable=var,value=2)
r2.place(x=150,y=150)
```

```
r3=Radiobutton(f,text="CIVIL",variable=var,value=3)
r3.place(x=250,y=150)
r4=Radiobutton(f,text="MECH",variable=var,value=4)
r4.place(x=350,y=150)
r5=Radiobutton(f,text="IS",variable=var,value=5)
r5.place(x=450,y=150)
b=Button(f,text="SUBMIT")
b.place(x=300,y=300)
b.bind("<Button-1>",click)
root.mainloop()
```

```
# MenuBar program
from tkinter import *
root=Tk()
mb=Menu(root)
root.config(menu=mb)
def donothing():
   pass
def open_file():

filemenu=Menu(root,tearoff=1)
filemenu.add_command(label="New",command=donothing)
filemenu.add_command(label="Open",command=open_file)
filemenu.add_command(label="Save",command=donothing)
filemenu.add_command(label="Save As",command=donothing)
filemenu.add_separator()
mb.add_cascade(label="File",menu=filemenu)
editmenu=Menu(root,tearoff=0)
editmenu.add_command(label="Cut",command=donothing)
editmenu.add_command(label="Copy",command=donothing)
editmenu.add_command(label="Paste",command=donothing)
editmenu.add_command(label="Undo",command=donothing)
mb.add_cascade(label="Edit",menu=editmenu)
```

```
root.mainloop()
# horizontal scrollbar

from tkinter import *

root = Tk()
root.geometry("150x200")

w = Label(root, text ='welcome to python proramming',
        font = "50")

w.pack()

scroll_bar = Scrollbar(root)

scroll_bar.pack( side = BOTTOM,
              fill = X )
root.mainloop()
```

```
# vertical scrollbar

from tkinter import *

root = Tk()
root.geometry("150x200")

w = Label(root, text ='welcome to python proramming',
        font = "50")

w.pack()

scroll_bar = Scrollbar(root)

scroll_bar.pack( side = RIGHT,
              fill = Y )
root.mainloop()
# image program
from tkinter import *
root=Tk()
c=Canvas(root)
c.pack()
```

```
file=PhotoImage(file="D:\python\s.png")
c.create_image(200,200,anchor=CENTER,image=file)
root.mainloop()
```