PROJECT DISCRIPTION:

This mini project is based on the topic "EXPLORE AND KNOW SPACE"

The project consist 3 topics:

1) Explore Space: This topic contains three sub topics which contains information about:

```
a) All the 8 planets of our Solar Syatem
(Mercury,Venus,Earth,Mars,Jupiter,Saturn,Uranus,Neptune):
    This topics will help users to know more about planets of solar
system and will build thier interest towards other         planets by
gaining knowledge.

b) Spacecrafts:
    This is my favourite topic as this topic contains information about
the best spacecrafts created by humans.
    This topic consist of information about three spacecrafts: VOYAGER 1
, VOYAGER 2 and NEW HORIZON.
    This Spacecrafts are travelling in deep space(intestellar space) and
are one of the biggest achivements mankind             have achived till
now.
    They will never stop the voyage and will continue thier journey even
after losing contact with mankind.

c) Star:
    This topic will help users to know more about the most important star
for humans - 'SUN'
    Sun is one the reason why mankind exist and is still protecting us
from harmfull cosmic rays and dust from beyond           the solar system
by enveloping us in the heliosphere.
```

2) Space Calculator:

```
It help users to do expriment and gain knowledge about planets by
calculating different weights on differnt planets.
This helps user to know how different is Earth in compare to other
planets.
```

3) ISS tracker:

```
Through this users can track the positiion of International Space Station
at an interval of 5 seconds i.e. after every     5 seconds the program
refreshes itself and update the position of International Space Station.
```

In [1]:

```
from tkinter import *
from PIL import ImageTk,Image
import turtle
```

```
import urllib.request
import time
import json
import space_calculator


root = Tk()
root.geometry("700x600")
root.config(bg='#2b2e38')

def exp_space():
    global root
    root.withdraw()

    wind_1 = Toplevel(root)
    wind_1.geometry("700x600")

    space_frame = Frame(wind_1,bg='#2b2e38',height=700,width=700)
    space_frame.pack()

    pic_frame = Frame(space_frame,bg='#2b2e38')
    pic_frame.place(relx=0.01,rely=0.17,relheight=0.7,relwidth=0.5)

    desc_frame = Frame(space_frame)
    desc_frame.place(relx=0.53,rely=0.17,relheight=0.7,relwidth=0.45)

    initial_label = Label(desc_frame,bg = '#121212',fg = 'white')
    initial_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

    def planets(event):

        if clicked_1.get() == "Mercury":

            my = Image.open(r"C:\Users\asus\Desktop\planets\New\mercury.png")

            resized = my.resize((340,340), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.05)

            text = open(r"C:\Users\asus\Desktop\planets\New\mer.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()

        if clicked_1.get() == "Venus":
            my = Image.open(r"C:\Users\asus\Desktop\planets\New\venus.png")

            resized = my.resize((340,340), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.05)

            text = open(r"C:\Users\asus\Desktop\planets\New\ven.txt")
```

```
            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()

        if clicked_1.get() == "Earth":
            my = Image.open(r"C:\Users\asus\Desktop\planets\New\earth.png")

            resized = my.resize((340,340), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.05)

            text = open(r"C:\Users\asus\Desktop\planets\New\ear.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()

        if clicked_1.get() == "Mars":
            my = Image.open(r"C:\Users\asus\Desktop\planets\New\mars.png")

            resized = my.resize((340,340), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.05)

            text = open(r"C:\Users\asus\Desktop\planets\New\mars.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()

        if clicked_1.get() == "Jupiter":
            my = Image.open(r"C:\Users\asus\Desktop\planets\New\jupiter.png")

            resized = my.resize((340,340), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.05)

            text = open(r"C:\Users\asus\Desktop\planets\New\jup.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
```

```
            widget.destroy()

    if clicked_1.get() == "Saturn":
        my = Image.open(r"C:\Users\asus\Desktop\planets\New\saturn.png")

        resized = my.resize((217,413), Image.ANTIALIAS)
        new = ImageTk.PhotoImage(resized)
        m = Label(pic_frame, image=new,bg='#2b2e38')
        m.place(relx =0.2,rely = 0)

        text = open(r"C:\Users\asus\Desktop\planets\New\sat.txt")

        mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
        mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

        for widget in desc_frame.winfo_children:
            widget.destroy()
        for widget in pic_frame.winfo_children:
            widget.destroy()

    if clicked_1.get() == "Uranus":
        my = Image.open(r"C:\Users\asus\Desktop\planets\New\uranus.png")

        resized = my.resize((340,340), Image.ANTIALIAS)
        new = ImageTk.PhotoImage(resized)
        m = Label(pic_frame, image=new,bg='#2b2e38')
        m.place(relx =0.01,rely = 0.05)

        text = open(r"C:\Users\asus\Desktop\planets\New\ura.txt")

        mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
        mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

        for widget in desc_frame.winfo_children:
            widget.destroy()
        for widget in pic_frame.winfo_children:
            widget.destroy()

    if clicked_1.get() == "Neptune":
        my = Image.open(r"C:\Users\asus\Desktop\planets\New\neptune.png")

        resized = my.resize((340,340), Image.ANTIALIAS)
        new = ImageTk.PhotoImage(resized)
        m = Label(pic_frame, image=new,bg='#2b2e38')
        m.place(relx =0.01,rely = 0.05)

        text = open(r"C:\Users\asus\Desktop\planets\New\nep.txt")

        mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
        mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

        for widget in desc_frame.winfo_children:
            widget.destroy()
        for widget in pic_frame.winfo_children:
            widget.destroy()



def space_crafts(event):
```

```
        if clicked_2.get() == "Voyager 1":

            my = Image.open(r"C:\Users\asus\Desktop\planets\New\Voyager1.png")

            resized = my.resize((425,308), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.1)

            text = open(r"C:\Users\asus\Desktop\planets\New\voy1.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()

        if clicked_2.get() == "Voyager 2":
            my = Image.open(r"C:\Users\asus\Desktop\planets\New\Voyager1.png")

            resized = my.resize((430,300), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.1)

            text = open(r"C:\Users\asus\Desktop\planets\New\voy2.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()

        if clicked_2.get() == "New Horizon":
            my = Image.open(r"C:\Users\asus\Desktop\planets\New\Horizon.png")

            resized = my.resize((340,340), Image.ANTIALIAS)
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0.01,rely = 0.05)

            text = open(r"C:\Users\asus\Desktop\planets\New\horizon.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()

    def stars(event):
        if clicked_3.get() == "Sun":
            my = Image.open(r"C:\Users\asus\Desktop\planets\New\sun.png")

            resized = my.resize((375,375), Image.ANTIALIAS)
```

```
            new = ImageTk.PhotoImage(resized)
            m = Label(pic_frame, image=new,bg='#2b2e38')
            m.place(relx =0,rely = 0.05)

            text = open(r"C:\Users\asus\Desktop\planets\New\sun.txt")

            mer_label = Label(desc_frame,bg = '#121212',fg = 'white',text=text.read())
            mer_label.place(relx = 0 , rely = 0, relheight=1,relwidth=1)

            for widget in desc_frame.winfo_children:
                widget.destroy()
            for widget in pic_frame.winfo_children:
                widget.destroy()



    back = Button(space_frame,text="Go Back",bg='#2b2e38',fg='white', command=lambda: [
    back.place(relx=0.01,rely=0.93)


    planet=['Mercury','Venus','Earth','Mars','Jupiter','Saturn','Uranus','Neptune']
    clicked_1 = StringVar(space_frame)
    clicked_1.set("Planets")

    drop_1 = OptionMenu(space_frame,clicked_1, *planet,command=planets)
    drop_1.config(bg='#2b2e38',fg='white')
    drop_1.place(relx=0.05,rely=0.05,relheight=0.06,relwidth=0.2)


    space_craft=['Voyager 1','Voyager 2','New Horizon']
    clicked_2 = StringVar(space_frame)
    clicked_2.set("Spacecrafts")

    drop_2 = OptionMenu(space_frame,clicked_2,*space_craft,command=space_crafts)
    drop_2.config(bg='#2b2e38',fg='white')
    drop_2.place(relx=0.4,rely=0.05,relheight=0.06,relwidth=0.2)


    star=['Sun']
    clicked_3 = StringVar(space_frame)
    clicked_3.set("Stars")

    drop_3 = OptionMenu(space_frame,clicked_3,*star,command=stars)
    drop_3.config(bg='#2b2e38',fg='white')
    drop_3.place(relx=0.75,rely=0.05,relheight=0.06,relwidth=0.2)


    def disable_event():
        pass

    wind_1.protocol("WM_DELETE_WINDOW", disable_event)
    wind_1.mainloop()



def iss():
    screen = turtle.Screen()
    screen.setup(1280, 720)
    screen.setworldcoordinates(-180, -90, 180, 90)
```

```
# Load the world map image
    screen.bgpic("map.gif")
    screen.register_shape("iss.gif")
    iss = turtle.Turtle()
    iss.shape("iss.gif")
    iss.setheading(45)
    iss.penup()

    while True:
    # Load the current status of the ISS in real-time
        url = "http://api.open-notify.org/iss-now.json"
        response = urllib.request.urlopen(url)
        result = json.loads(response.read())

    # Extract the ISS location
        location = result["iss_position"]
        lat = location['latitude']
        lon = location['longitude']

    # Ouput lon and lat to the terminal
        lat = float(lat)
        lon = float(lon)


    # Update the ISS location on the map
        iss.goto(lon, lat)

    # Refresh each 5 seconds
        time.sleep(5)



def space_cal():
    global root
    root.withdraw()

    wind_2 = Toplevel(root)
    wind_2.geometry("700x600")
    wind_2.config(bg='#2b2e38')

    planet_label = Label(wind_2,text = "How much will you weight on",bg='#2b2e38',fg='w
    planet_label.place(relx=0.1,rely=0.16)

    weight_label = Label(wind_2,text = "Enter the weight on Earth",bg='#2b2e38',fg='whi
    weight_label.place(relx=0.1,rely=0.25)

    enter_weight = Entry(wind_2)
    enter_weight.place(relx=0.43,rely=0.25,relheight=0.05,relwidth=0.2)

    planet=['Moon','Mercury','Venus','Mars','Jupiter','Saturn','Uranus','Neptune']
    clicked = StringVar(wind_2)
    clicked.set("Planets")

    result_label = Label(wind_2,bg='#2b2e38')
    result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)

    def button_click(number):
        current = enter_weight.get()
        enter_weight.delete(0,END)
        enter_weight.insert(0,str(current) + str(number))
```

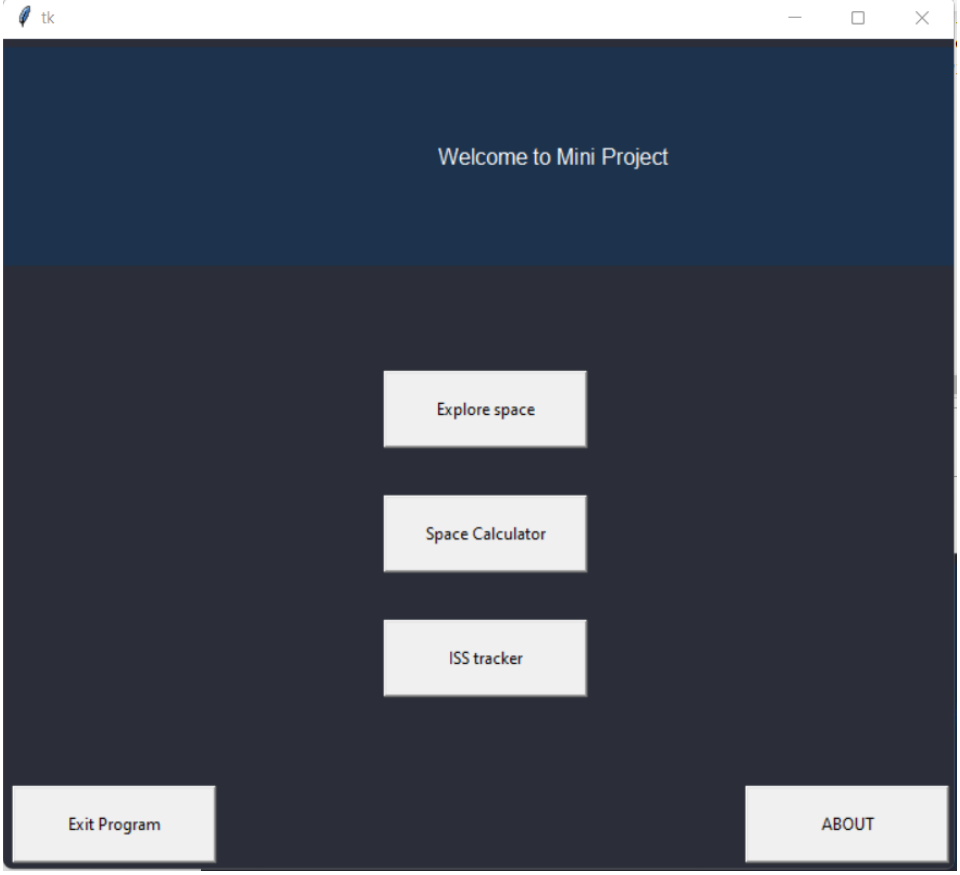
```
drop = OptionMenu(wind_2,clicked, *planet)
drop.config(bg='#2b2e38',fg='white')
drop.place(relx=0.43,rely=0.16,relheight=0.06,relwidth=0.2)

button1 = Button(wind_2,text ='1',command=lambda: button_click(1))
button1.place(relx=0.7,rely=0.3,relheight=0.07,relwidth=0.07)

button2 = Button(wind_2,text ='2',command=lambda: button_click(2))
button2.place(relx=0.8,rely=0.3,relheight=0.07,relwidth=0.07)

button3 = Button(wind_2,text ='3',command=lambda: button_click(3))
button3.place(relx=0.9,rely=0.3,relheight=0.07,relwidth=0.07)

button4 = Button(wind_2,text ='4',command=lambda: button_click(4))
button4.place(relx=0.7,rely=0.4,relheight=0.07,relwidth=0.07)

button5 = Button(wind_2,text ='5',command=lambda: button_click(5))
button5.place(relx=0.8,rely=0.4,relheight=0.07,relwidth=0.07)

button6 = Button(wind_2,text ='6',command=lambda: button_click(6))
button6.place(relx=0.9,rely=0.4,relheight=0.07,relwidth=0.07)

button7 = Button(wind_2,text ='7',command=lambda: button_click(7))
button7.place(relx=0.7,rely=0.5,relheight=0.07,relwidth=0.07)

button8 = Button(wind_2,text ='8',command=lambda: button_click(8))
button8.place(relx=0.8,rely=0.5,relheight=0.07,relwidth=0.07)

button9 = Button(wind_2,text ='9',command=lambda: button_click(9))
button9.place(relx=0.9,rely=0.5,relheight=0.07,relwidth=0.07)

button0 = Button(wind_2,text ='0',command=lambda: button_click(0))
button0.place(relx=0.7,rely=0.6,relheight=0.07,relwidth=0.07)

clear = Button(wind_2,text ='CLEAR',command=lambda: enter_weight.delete(0,END))
clear.place(relx=0.8,rely=0.6,relheight=0.07,relwidth=0.17)


def calculations():

    weight = enter_weight.get()
    global num
    num = float(weight)


    if clicked.get() == "Moon":

        new_weight = float(space_calculator.Moon(num))
        value = round(new_weight,2)

        result_label = Label(wind_2,text = "Your weight on " + clicked.get() + " wi
        result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)


    if clicked.get() == "Mercury":

        new_weight = float(space_calculator.Mercury(num))
        value = round(new_weight,2)
```

```
            result_label = Label(wind_2,text = "Your weight on " + clicked.get() + " wi
            result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)


        if clicked.get() == "Venus":

            new_weight = float(space_calculator.Venus(num))
            value = round(new_weight,2)

            result_label = Label(wind_2,text = "Your weight on " + clicked.get() + " wi
            result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)


        if clicked.get() == "Jupiter":

            new_weight = float(space_calculator.Jupiter(num))
            value = round(new_weight,2)

            result_label = Label(wind_2,text = "Your weight on " + clicked.get() + " wi
            result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)


        if clicked.get() == "Saturn":

            new_weight = float(space_calculator.Saturn(num))
            value = round(new_weight,2)

            result_label = Label(wind_2,text = "Your weight on " + clicked.get() + " wi
            result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)


        if clicked.get() == "Uranus":

            new_weight = float(space_calculator.Uranus(num))
            value = round(new_weight,2)

            result_label = Label(wind_2,text = "Your weight on " + clicked.get() + " wi
            result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)


        if clicked.get() == "Neptune":

            new_weight = float(space_calculator.Neptune(num))
            value = round(new_weight,2)

            result_label = Label(wind_2,text = "Your weight on " + clicked.get() + " wi
            result_label.place(relx=0.1,rely=0.37,relheight=0.2,relwidth=0.6)



    back = Button(wind_2,text="Go Back",command=lambda: [wind_2.destroy(),root.deiconif
    back.place(relx=0.01,rely=0.9)

    calculate = Button(wind_2,text="calculate",command= calculations,height=2,width=15)
    calculate.place(relx=0.4,rely=0.65)

    def disable_event():
        pass

    wind_2.protocol("WM_DELETE_WINDOW", disable_event)
```

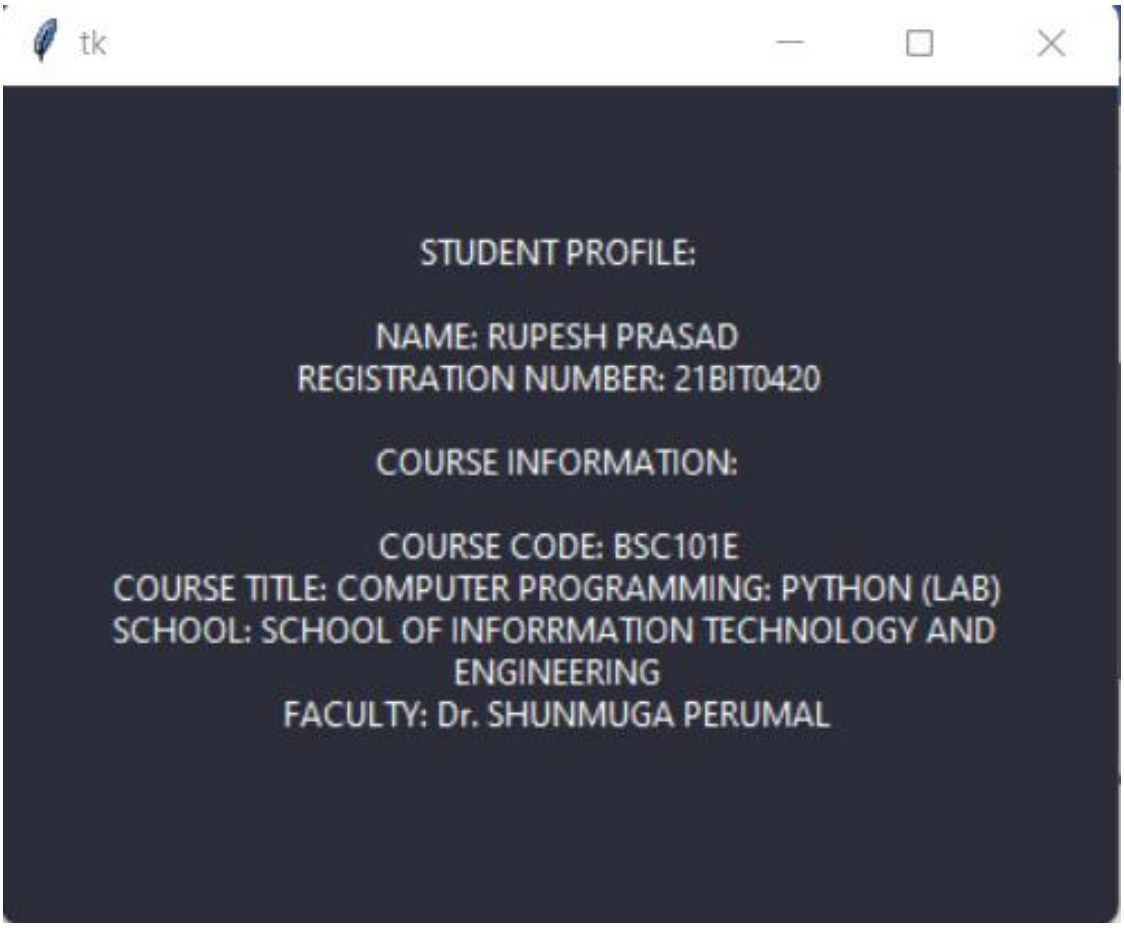
```
    wind_2.mainloop()


def about():
    global root
    root.withdraw()

    wind_3 = Toplevel(root)
    wind_3.geometry("400x300")

    txt = open(r"C:\Users\asus\Desktop\planets\New\about.txt")

    label = Label(wind_3,text= txt.read(),bg='#2b2e38',fg='white')
    label.place(relx=0,rely=0,relheight=1,relwidth=1)

    wind_3.mainloop()




main_label=Label(root,text="Welcome to Mini Project",bg='#1d334d',fg='white',bd=20,anch
main_label.config(font='50')
Planets=Button(root, text="Explore space", command=exp_space, height=3, width=20)
exit=Button(root, text="Exit Program", command=root.destroy, height=3, width=20)
calculator=Button(root, text="Space Calculator", command=space_cal,height=3, width=20)
iss_tracker=Button(root, text="ISS tracker", command=iss,height=3, width=20)
about = Button(root,text="ABOUT",height=3, width=20,command=about)

main_label.place(rely=0.01)
Planets.place(relx=0.4,rely=0.4)
calculator.place(relx=0.4,rely=0.55)
iss_tracker.place(relx=0.4,rely=0.7)
exit.place(relx=0.01,rely=0.9)
about.place(relx=0.78,rely=0.9)


root.mainloop()
```

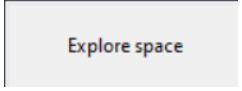
```
Exception in Tkinter callback
Traceback (most recent call last):
  File "C:\Program Files\Python310\lib\tkinter\__init__.py", line 1921, in __call__
    return self.func(*args)
  File "C:\Users\asus\AppData\Local\Temp/ipykernel_11844/1964279009.py", line 329, in is
s
    iss.goto(lon, lat)
  File "C:\Program Files\Python310\lib\turtle.py", line 1777, in goto
    self._goto(Vec2D(x, y))
  File "C:\Program Files\Python310\lib\turtle.py", line 3159, in _goto
    screen._pointlist(self.currentLineItem),
  File "C:\Program Files\Python310\lib\turtle.py", line 754, in _pointlist
    cl = self.cv.coords(item)
  File "<string>", line 1, in coords
  File "C:\Program Files\Python310\lib\tkinter\__init__.py", line 2795, in coords
    self.tk.call((self._w, 'coords') + args))]
_tkinter.TclError: invalid command name ".!canvas"
```

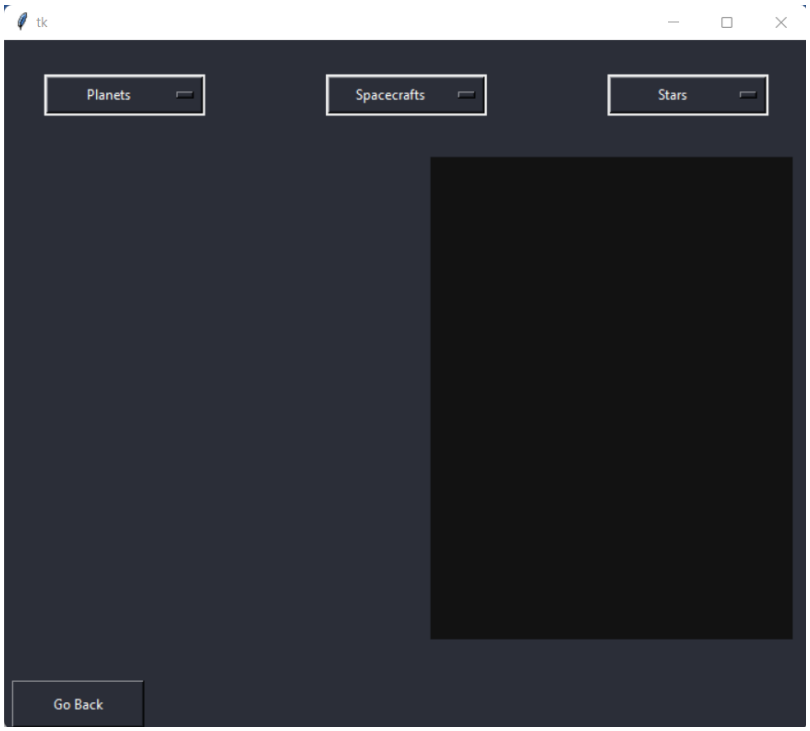
In [ ]:

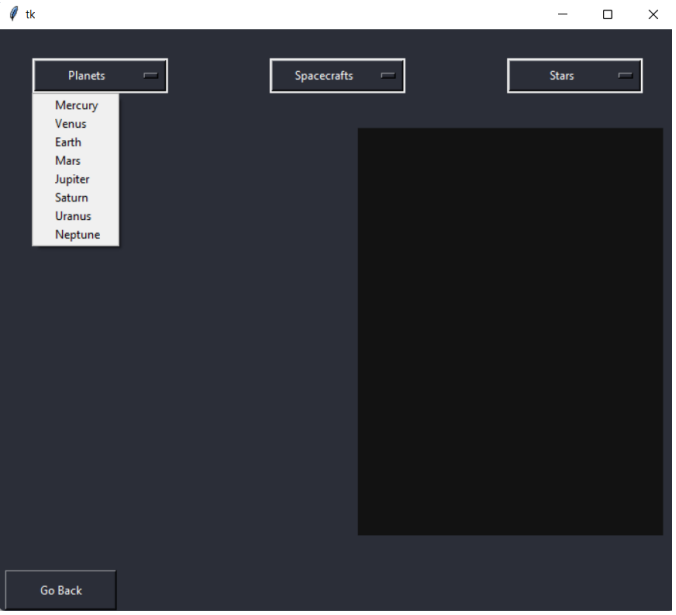

tk
Welcome to Mini Project
Explore space
Space Calculator
ISS tracker
Exit Program
ABOUT

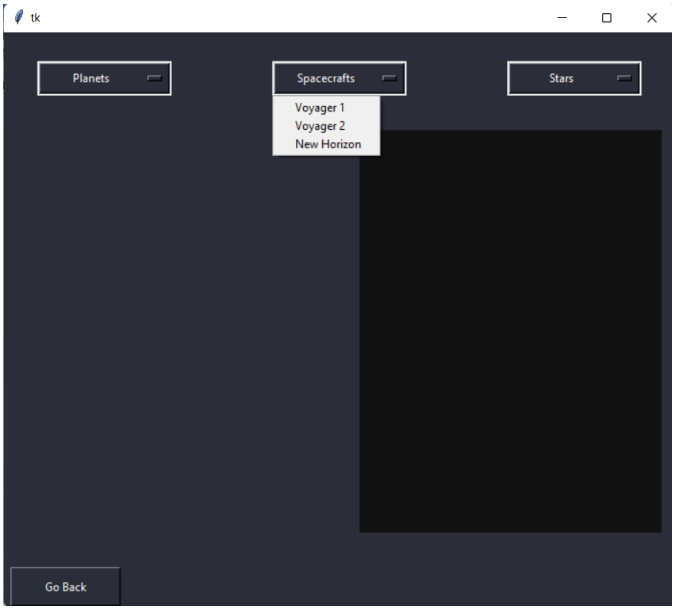
ABOUT

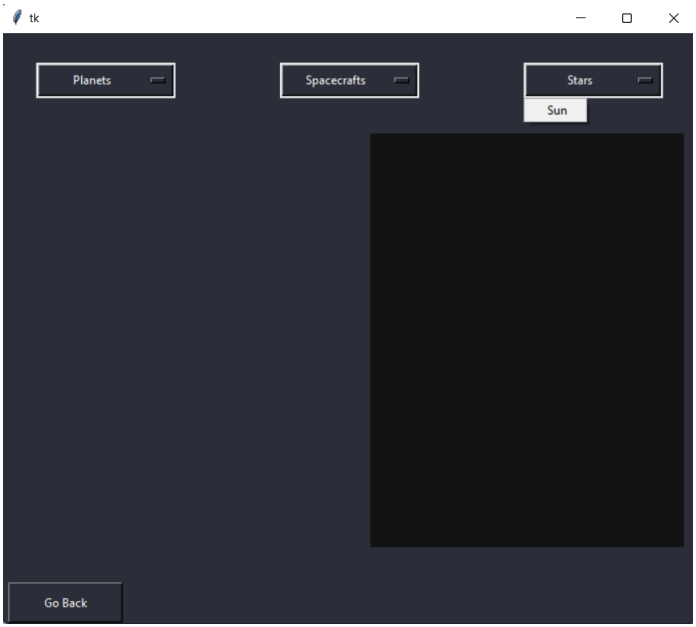

tk
STUDENT PROFILE:
NAME: RUPESH PRASAD
REGISTRATION NUMBER: 21BIT0420
COURSE INFORMATION:
COURSE CODE: BSC101E
COURSE TITLE: COMPUTER PROGRAMMING: PYTHON (LAB)
SCHOOL: SCHOOL OF INFORRMATION TECHNOLOGY AND ENGINEERING
FACULTY: Dr. SHUNMUGA PERUMAL


Explore space


tk
Planets
Spacecrafts
Stars
Go Back

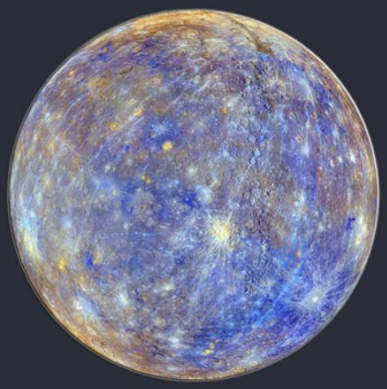

tk
Planets
Spacecrafts
Stars
Mercury
Venus
Earth
Mars
Jupiter
Saturn
Uranus
Neptune
Go Back


tk
Planets
Spacecrafts
Stars
Voyager 1
Voyager 2
New Horizon
Go Back


tk
Planets
Spacecrafts
Stars
Sun
Go Back

tk

Mercury | Spacecrafts | Stars



ENCYCLOPEDIA
EQUATORIAL DIAMETER 4879 KM
MASS 3.3 X 10^23 KG
MEAN DIST.FROM SUN 58.1M KM
ROTATION PERIOD 59 DAYS
SOLAR ORBIT PERIOD 88 DAYS
SURFACE GRAVITY 3.7 M/S^2
SURFACE TEMPERATURE 167Â°C
TEMPERATURE - DAY 473Â°C
TEMPERATURE - NIGHT -183Â°C

Mercury is the innermost and smallest planet of the Solar System. Because it has almost no atmosphere to retain heat, Mercury surface experiences the greatest temperature variation of all the planets.

Observation
Mercury appears as a morning or evening star from Earth, but due to its proximity to Sun, it is very hard to see. Still, Mercury can be observed at least twice a year: in spring at dusk and in autumn before dawn.

Go Back

tk

Venus | Spacecrafts | Stars

ENCYCLOPEDIA
EQUATORIAL DIAMETER 12104 KM
MASS 4.9 X 10^24 KG
MEAN DIST.FROM SUN 108M KM
ROTATION PERIOD 243 DAYS
SOLAR ORBIT PERIOD 225 DAYS
SURFACE GRAVITY 8.9 M/S^2
SURFACE TEMPERATURE 462Â°C

Although Venus has very similar size and interior structure as Earth, its vulcanic surface and extremely hot and dense atmosphere makes it one of the most inhospitable places in the Solar System.

Atmosphere
Thick clouds of sulfuric acid and dust reflect most of the SunÃ¢â‚¬â„¢s light back to space, while carbon dioxide traps the Sun heat inside the atmosphere, causing aÃ runaway greenhouse effect. The atmospheric pressure on the surface of Venus is 92 times greater than on Earth.

Observation
Venus is one of the brightest objects in our night sky. It appears as either an evening or aÃ morning star.

Go Back

tk

Earth | Spacecrafts | Stars

ENCYCLOPEDIA
EQUATORIAL DIAMETER 12756 KM
MASS 6 X 10^24 KG
MEAN DIST.FROM SUN 150M KM
ROTATION PERIOD 23H 56M
SOLAR ORBIT PERIOD 1 YEAR
SURFACE GRAVITY 9.8 M/S^2
SURFACE TEMPERATURE 15Â°C

Our homeworld is theÃ densest of the eight planets in theÃ Solar System. It is also the largest of the four terrestrial planets.

Surface
About 71% of the Earth surface is covered by salt water oceans, and the remaining 30% is taken up by the seven continental landmasses. Earth outer surface is also divided into several rigid segments, or tectonic plates, that migrate across the surface over periods of millions of years.

Go Back

tk

Mars | Spacecrafts | Stars

ENCYCLOPEDIA
EQUATORIAL DIAMETER 6792 KM
MASS 6.4 X 10^23 KG
MEAN DIST.FROM SUN 230M KM
ROTATION PERIOD 1.03 DAYS
SOLAR ORBIT PERIOD 1.88 YEARS
SURFACE GRAVITY 3.7 M/S^2
SURFACE TEMPERATURE -63Â°C
TEMPERATURE - Summer 17Â°C
TEMPERATURE - Winter -140Â°C

Mars is the fourth planet from the Sun and the second smallest planet in the Solar System. The reddish appearance of Mars surface is caused by iron oxide (rust).

Observation
Mars can easily be seen from Earth with the naked eye, as can its reddish coloring. Its apparent magnitude is surpassed by the Sun, the Moon, Venus and Jupiter - but it can briefly match JupiterÃ¢â‚¬â„¢s brightness at certain points in its orbit.

Go Back

tk

Uranus | Spacecrafts | Stars

ENCYCLOPEDIA
EQUATORIAL DIAMETER 51118 KM
MASS 8.7 X 10^25 KG
MEAN DIST.FROM SUN 19.2M KM
ROTATION PERIOD 17H 14M
SOLAR ORBIT PERIOD 84 YEARS
SURFACE GRAVITY 8.7 M/S^2
SURFACE TEMPERATURE -210Â°C

Uranus is the third largest of the Solar System gas giants. It is the coldest planet in the Solar System.

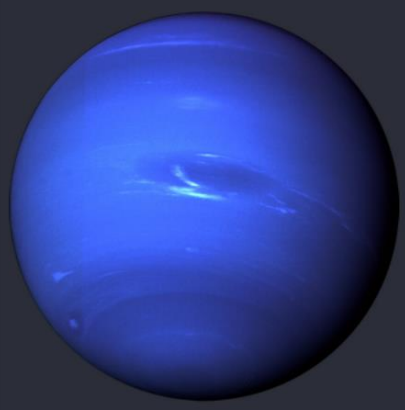
Observation
While in Opposition (from the Sun, relative to the Earth), Uranus becomes visible to the naked-eye. It would appear as a faint star under dark sky conditions.

Discovery
Uranus was the first to be discovered by the use of the modern telescope, with its discovery credited to the English astronomer William Herschel in 1781.

Go Back

tk

Neptune | Spacecrafts | Stars



ENCYCLOPEDIA
EQUATORIAL DIAMETER 49528 KM
MASS 1.02 X 10^26 KG
MEAN DIST.FROM SUN 30.1 AU
ROTATION PERIOD 16H 06M
SOLAR ORBIT PERIOD 165 YEARS
SURFACE GRAVITY 11.2 M/S^2
SURFACE TEMPERATURE -200Â°C

Neptune, is the eight and officially farthest planet from the Sun. It is the smallest but also the most dense of gas giants. Neptune has a surface gravity that is only surpassed by Jupiter.

Discovery
Neptune was the first planet to be discovered purely on the basis of mathematical prediction rather than by direct observation. Since it discovery in 1846, Neptune has completed only one orbit of the Sun.

Go Back

tk

Jupiter | Spacecrafts | Stars

ENCYCLOPEDIA
EQUATORIAL DIAMETER 142984 KM
MASS 1.9 X 10^27 KG
MEAN DIST.FROM SUN 779M KM
ROTATION PERIOD 9H 55M
SOLAR ORBIT PERIOD 11.9 YEARS
SURFACE GRAVITY 25 M/S^2
SURFACE TEMPERATURE -120Â°C

Jupiter is the largest planet of the Solar System, with aÂ, mass 2.5 greater than all of the rest of the planets combined - but still only one-thousandth that of the Sun.

Observation
Jupiter is the fourth brightest object in our skies after the Sun, Moon and Venus. Because the orbit of Jupiter is outside the Earth, the planet always appears nearly fully illuminated when viewed through Earth-based telescopes.

Go Back

tk

Saturn | Spacecrafts | Stars

ENCYCLOPEDIA
EQUATORIAL DIAMETER 120536 KM
MASS 5.7 X 10^26 KG
MEAN DIST.FROM SUN 9.57 AU
ROTATION PERIOD 10H 39M
SOLAR ORBIT PERIOD 29 YEARS
SURFACE GRAVITY 10.4 M/S^2
SURFACE TEMPERATURE -139Â°C

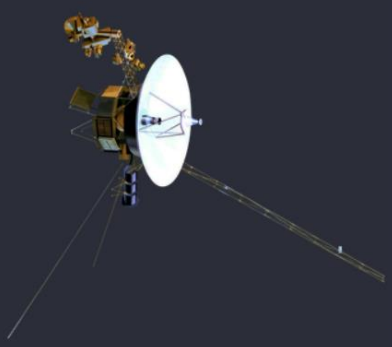
Saturn is the sixth planet from the Sun and the second largest planet in the Solar System. Until the invention of modern telescope, Saturn was regarded as the outermost of the known planets.

Ring
While the other gas giants also have ring systems, Saturn is larger and more visible than any other in the Solar System. The rings are composed of water ice crystals and a smaller amount of rock, ranging in size from specks of dust to a few particles as large as mountains.

Go Back

tk

Neptune | Voyager 1 | Stars



What is Voyager 1?

No spacecraft has gone farther than NASA's Voyager 1. Launched in 1977 to fly by Jupiter and Saturn, Voyager 1 crossed into interstellar space in August 2012 and continues to collect data.

> Voyager 1 and its sister ship Voyager 2 have been flying longer than any other spacecraft in history.

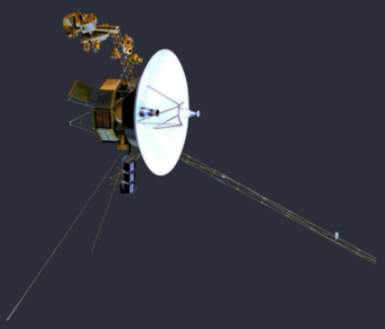
> Not only are the Voyager missions providing humanity with observations of truly uncharted territory, but they are also helping scientists understand the very nature of energy and radiation in spaceâ€"key information for protecting future missions and astronauts.

> Voyager 1 carries a copy of the Golden Recordâ€"a message from humanity to the cosmos that includes greetings in 55 languages, pictures of people and places on Earth and music ranging from Beethoven to Chuck Berry's "Johnny B. Goode."

Go Back

tk

Neptune | Voyager 2 | Stars



What is Voyager 2?

NASA's Voyager 2 is the second spacecraft to enter interstellar space. On Dec. 10,2018, the spacecraft joined its twinâ€"Voyager 1â€"as the only human-made objects to enter the space between the stars.

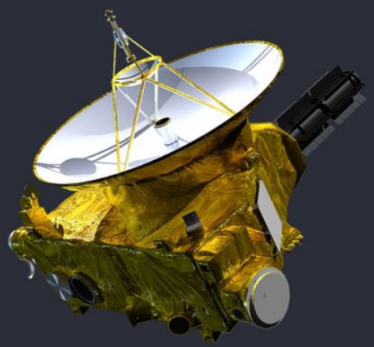
> Voyager 1 and 2 were designed to take advantage of a rare planetary alignment to study the outer solar system up close. Voyager 2 targeted Jupiter, Saturn, Uranus and Neptune.

>Like its sister spacecraft, Voyager 2 also was designed to find and study the edge of our solar system.

Go Back

tk

Neptune | New Horizon | Stars



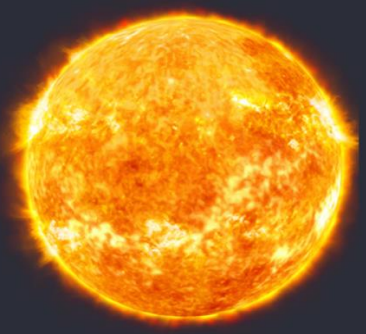
What is New Horizons?

NASA's New Horizons spacecraft is the first spacecraft to explore Pluto up close, flying by the dwarf planet and its moons on July 14, 2015. In early 2019, New Horizons flew past its second major science targetâ€"2014 MU69, the most distant object ever explored up close.

Go Back

tk

Neptune | New Horizon | Sun



The Sun, also referred to as "Sol", is the star at the center of the Solar System. Sun mass accounts for some 99.86% of the total mass of the Solar System.

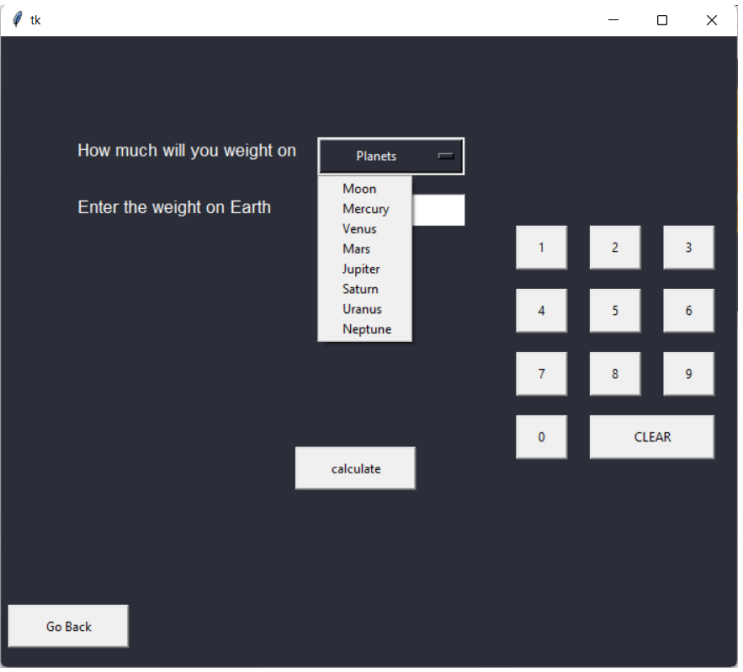
Composition
Roughly three-quarters of the Sun mass is hydrogen, with the rest mostly helium. Only 1.69% of the Sun (which is still 5628 times the mass of the Earth) is made up of heavier elements like carbon, iron, neon and oxygen.

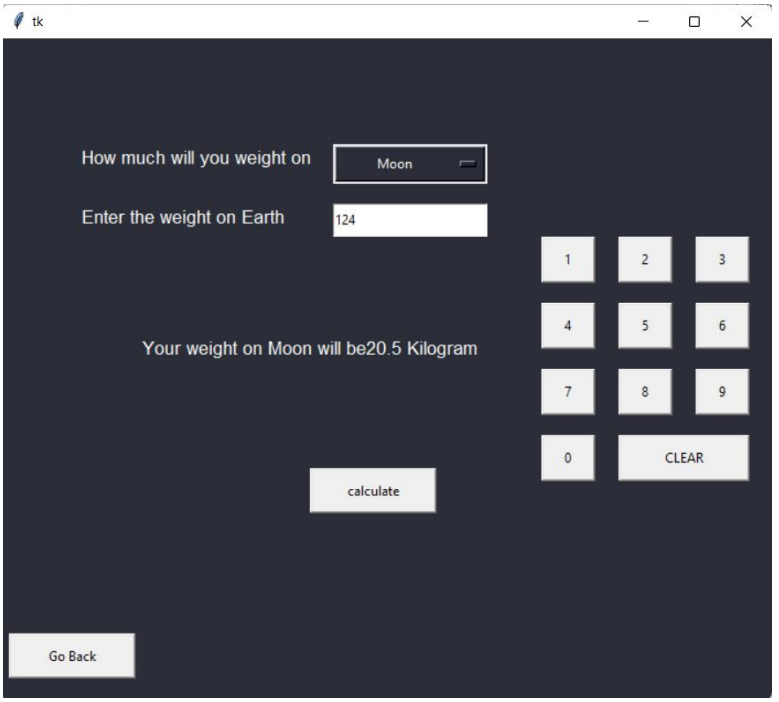
Distance
The mean distance of the Sun from the Earth is approximately 149.6 million kilometres (1 AU). On average, it takes light from the Sun about 8 minutes and 19 seconds to reach the Earth.

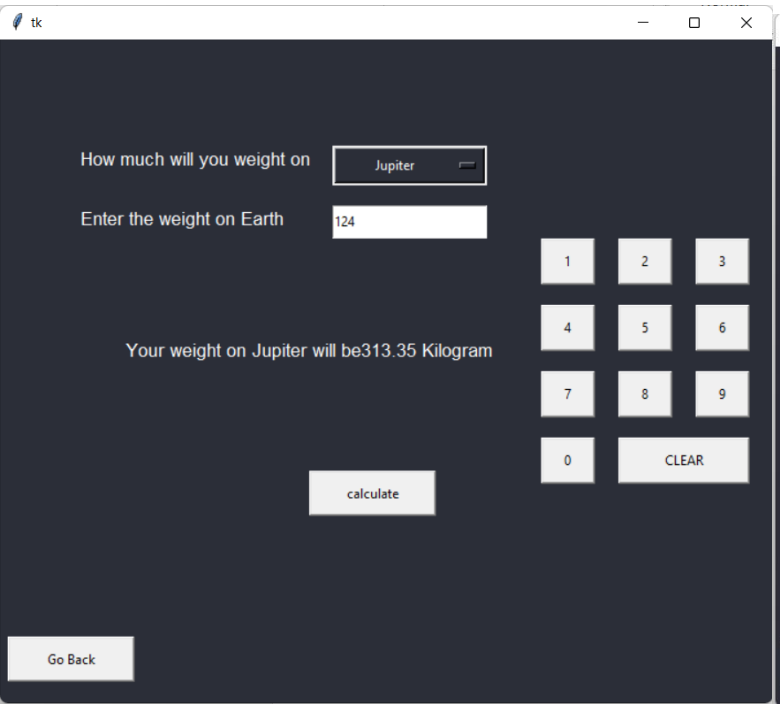
Galaxy
Once thought to be a relatively insignificant star, the Sun is now considered to be brighter than about 85% of the stars in the Milky Way galaxy. It is located about two thirds of the way out from the centre of the Milky Way.

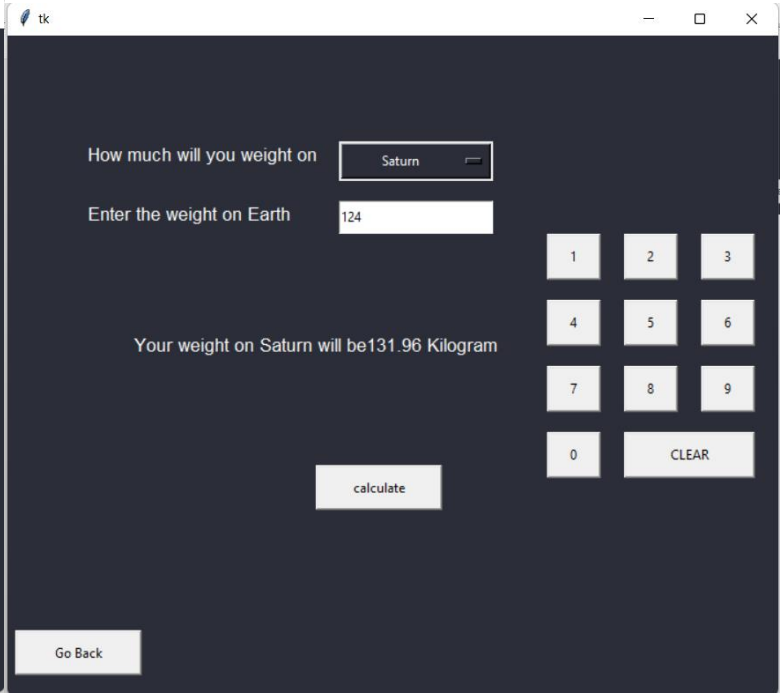
Go Back

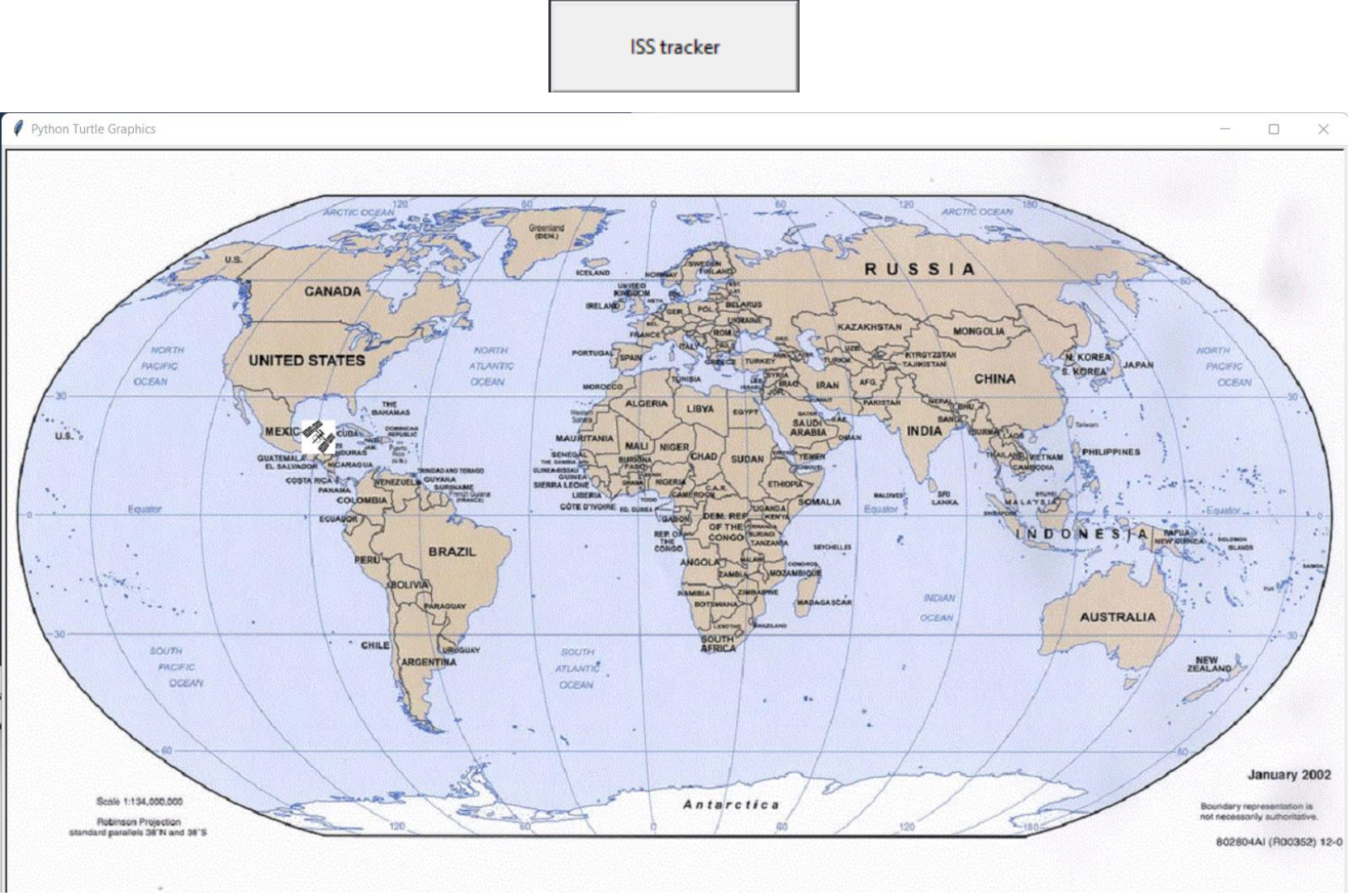
Space Calculator











Position ALMOST AFTER 1min