Python for Kids

```
import turtle
t=turtle.Turtle()
t.forward(100)
```

Lesson 13: How to download Image to Python Turtle project

Python turtle graphics allows you to use images downloaded from Internet or other resources and generate animation on a computer monitor. With turtle, you can use only image files with the extension .gif. Let's start with an example: simulation an earth revolving around a Sun. We are going to explain how to use image for animation. Create a code with motion commands that are familiar to you from previous lessons:

1. **Example #1** (Earth revolving around a Sun)

Code:

```
1    import turtle
2    import time
3    wn=turtle.Screen()
4    wn.setup(800,800)
5    wn.bgcolor('black')
6
7    wn.tracer(5)
8
9    sun=turtle.Turtle('circle')
10   sun.penup()
11   sun.shapesize(8)
12   sun.color('yellow')
13   sun.setposition(0,0)
14
15   earth=turtle.Turtle('circle')
16   earth.shapesize(2)
17   earth.color('grey')
18   earth.up()
19   earth.hideturtle()
20   earth.goto(0,-200)
21   earth.showturtle()
22
23   while True:
24       earth.circle(200,1)
25       time.sleep(0.03)
```

Here you see a few new commands:

1. Import time→ this line calls time module from Python library. This module provides various time-related functions. For example, in our code line #25 suspends execution of the calling thread for the given number of seconds (in our case 0.03 sec). This line is equivalent to the Scratch
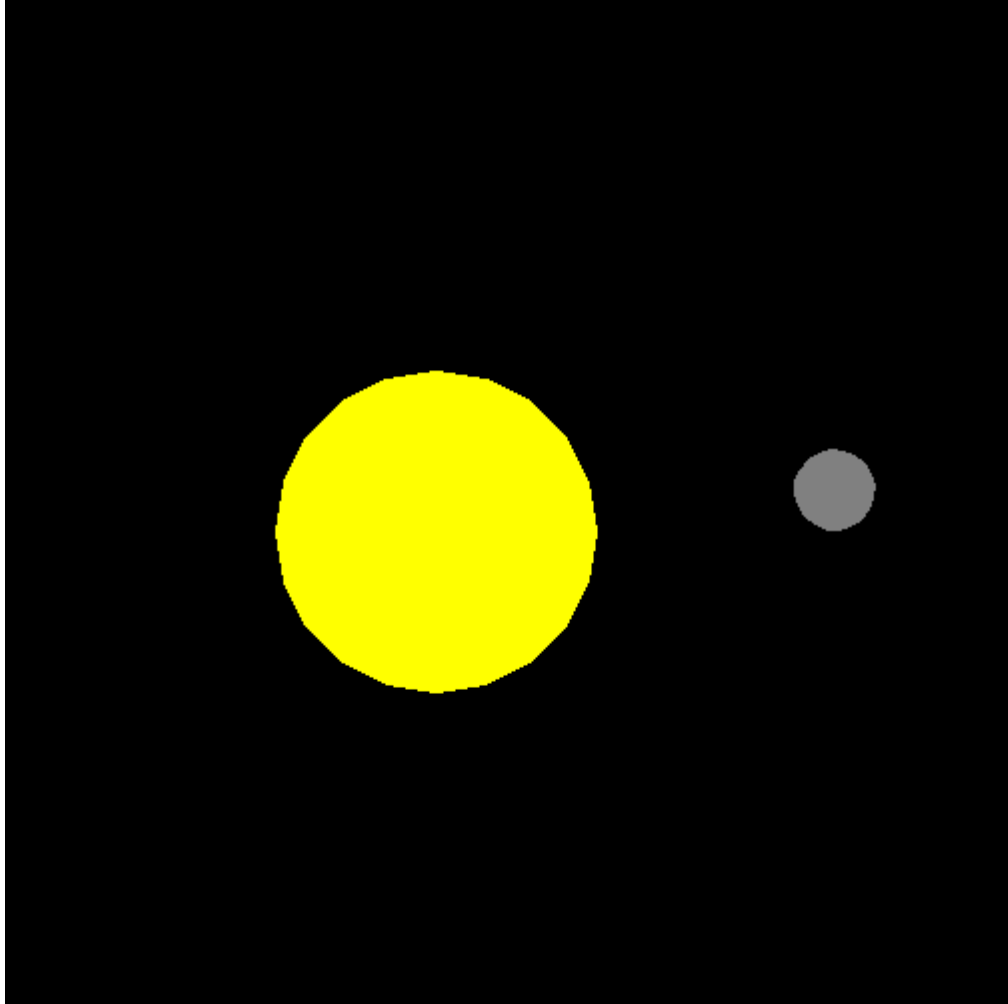
    `wait 0.03 seconds`

    block-based command;
2. Line #2 and #3 set horizontal and vertical size of the main window;

3. Line #4 sets the colour of the screen;
4. Line #7 set delay for update drawings, provides smooth and fast motion of the earth around the Sun. You can try different arguments numbers to estimate the effect on the result.

Static code Result:

Now we will insert images for sun and earth to the code **Example #1**. Images are downloaded from Internet.

Code with inserted images looks like:

1. **Example #2**

```python
import turtle
import random
turtle.tracer(4)
t=turtle.Turtle()
wn=turtle.Screen()
wn.screensize(800,800,'dark blue')
t.speed(10)
import time

# Function design of sky stars
def star(x,y,size):
    t.up()
    t.goto(x,y)
    t.down()
    t.color('white','white')
    t.begin_fill()
    t.left(36)
    for i in range(5):
        t.fd(size)
        t.left(144)
    t.end_fill()

#Draw 50 random located stars with different size
for i in range(50):
    starX=random.randint(-400,400)
    starY=random.randint(-400,400)
    starsize=random.randint(10,20)
    star(starX,starY,starsize)
t.hideturtle()

wn.tracer(10)

sun=turtle.Turtle()
sun.penup()
image1='sun6.gif'
wn.addshape(image1)
sun.shape(image1)
sun.setposition(0,0)

earth=turtle.Turtle()
earth.up()
image2='earth6.gif'
wn.addshape(image2)
earth.shape(image2)

earth.goto(0,-200)
earth.showturtle()

while True:
    earth.circle(200,1)
    time.sleep(0.02)
```

This code includes **two** inserted images: line #35 for the sun and line #42 for the earth. We have found images on Internet, then converted each of them to the files with gif extension and inserted it into the code.

First image named image1=**'sun6.gif '** in line 35 by variable image1, is inserted to this code using two following lines: line #36 and line #37. Line #36 says that we added our image to the screen and line #37 determines image as a turtle with a name sun. So, now we can apply to the turtle with a name **sun** all functions from module turtle. So, now instead of standard turtle shapes (Lesson #5) we can use turtle sun, which is an image inserted from Internet source. **This is main idea to use images in the Python turtle module.** File with this image has to be placed in the same directory where main code file is located.

You find all these images with gif extension in Lesson #13, Example #3. Build this code with images and try how it works. Again, keep in mind that files: **sun6.gif**, and **earth6.gif** and file with main code have to be located in the same directory. Keep in mind that **Python accepts file with an extension.gif only.** We have found this image on the Internet, then save it at our computer in the folder with the main code file.

Below it is shown Sun image that we have chosen from Internet.
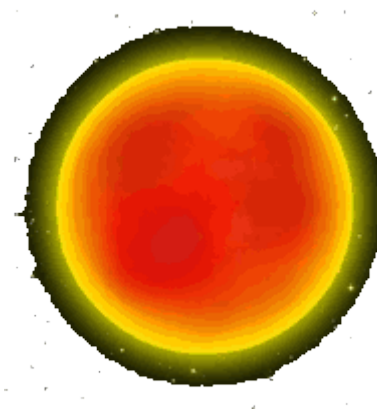
File has dimensions 194×200 pixels. Keep in mind that we need images with transparent parts because when one image passes over or near another as it moves across the screen, we don't want the background of one image to wipe out part of another. For example, in this image, the checkerboard pattern in the background represents the transparent area:

Earth image, named in the code as image2=**'earth6.gif '**(line #20). is inserted to this code using two following lines: line #21 and line #22. Therefore, now instead of standard turtle shapes (Lesson #5) we can use second turtle named as an earth, which is an image inserted from Internet source.
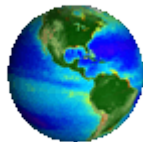
File has dimensions 70×70 pixels. In this image, the checkerboard pattern in the background also represents the transparent area.

Static Code Result:
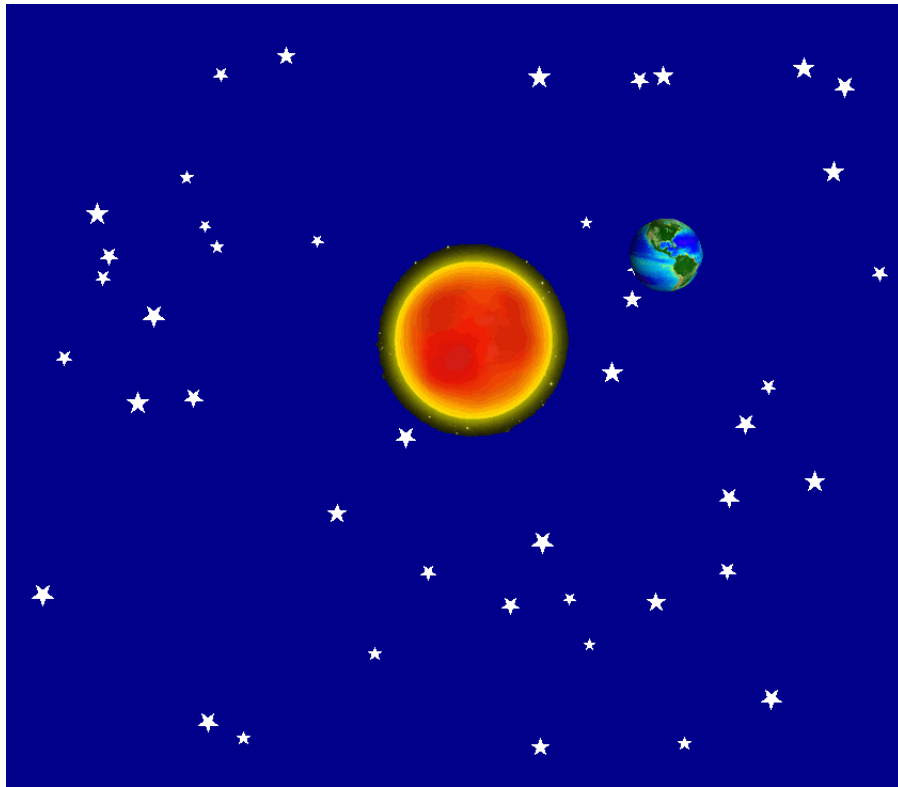
Video below shows the final result (click on the image or link to watch video)

https://youtu.be/5lZCOakAb1o

All files with .gif extensions that are used in this lessons can be downloaded from Lesson #13 (python.kidsgo.ca). You have to download these images to your computer directory where your main code file is located. To download the image to your computer you have (with right side mouse) to click an image and in the pop-up window choose an option save as. (see bellow an example with sun image). Choose the folder with main code at your computer and save file (as shown below).
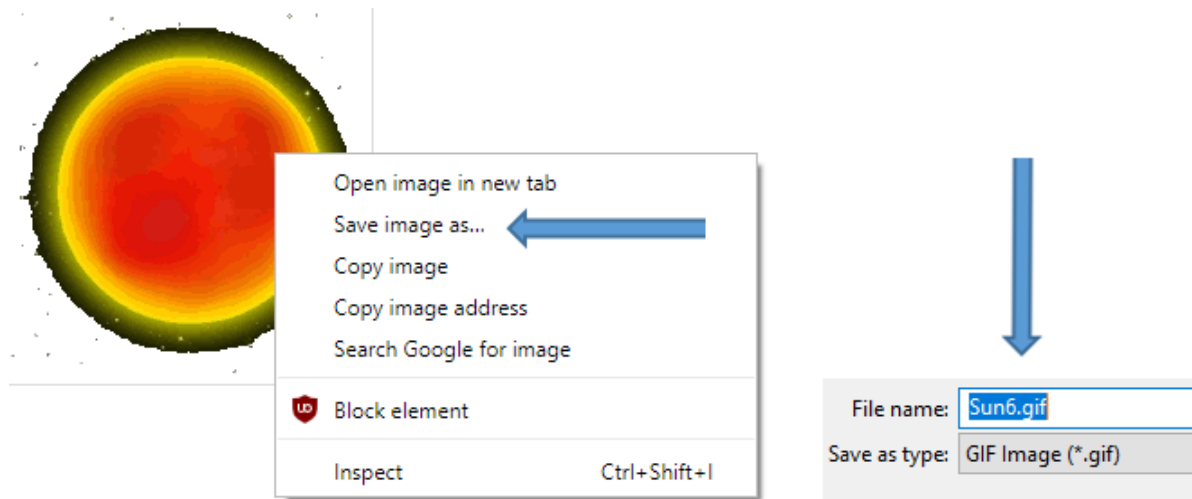

You can choose images for your animation/simulation from any resources, for example Internet pages. Again, keep in mind that Python Turtle accepts file with an extension.gif only. If you have chosen image that has an extension .png. jpg, or jepg, or .gif you have to convert it to file with an extension .gif.

Below we give some recommendations how to convert image file with any extension to the file with gif extension. As a new reader you can skip this paragraph. Our **website python.kidsgo.ca (lesson#13) contains all images that you need** to use for animation examples in format .gif. You have to download these images to your computer to the directory where your main code file is located. To download the image to the computer you have (with right side mouse) to click an image and in the pop-up window choose an option **save as.**

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Skip it if you are new reader!!!

How to create image with .gif extension (As a new reader you can skeep this paragraph).

The simplest program Paint that will be able to save your image file with an extension .gif on your computer comes with computer Window software. To find this program on your computer follow the instructions shown in video:
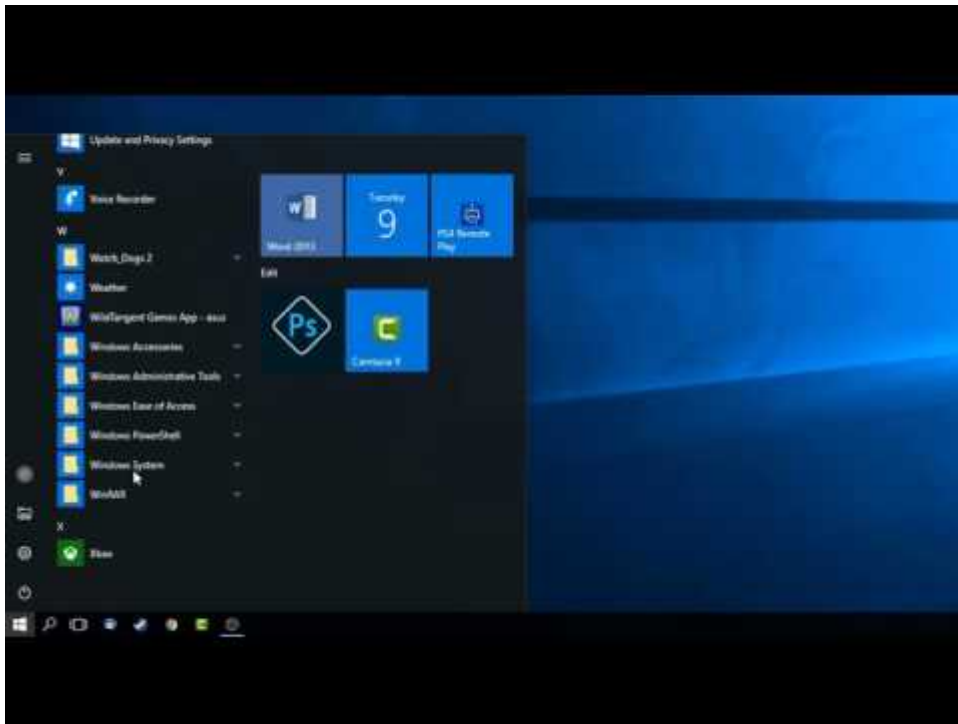
Below it is shown simplest explanation of the method presented in video:

1 **Open the Start menu.** To access Microsoft Paint, you will need to navigate through a couple of steps in the Start menu; open the Start menu by clicking the button in the lower left-hand corner of your screen with the left mouse button.

- Regardless of your operating system, the Start menu will always be in the lower left-hand corner.
- You can also bring up the Start menu by pressing the ⊞ Win key on your keyboard; although this key may vary in location, it will normally be in the lower left-hand corner of your keyboard.

Then type word **paint** and you will see the program **Paint**. DoubleClick on the word Paint and you are ready. Program **paint** is opened.

Below it is shown the screenshot of the opened **paint** program.
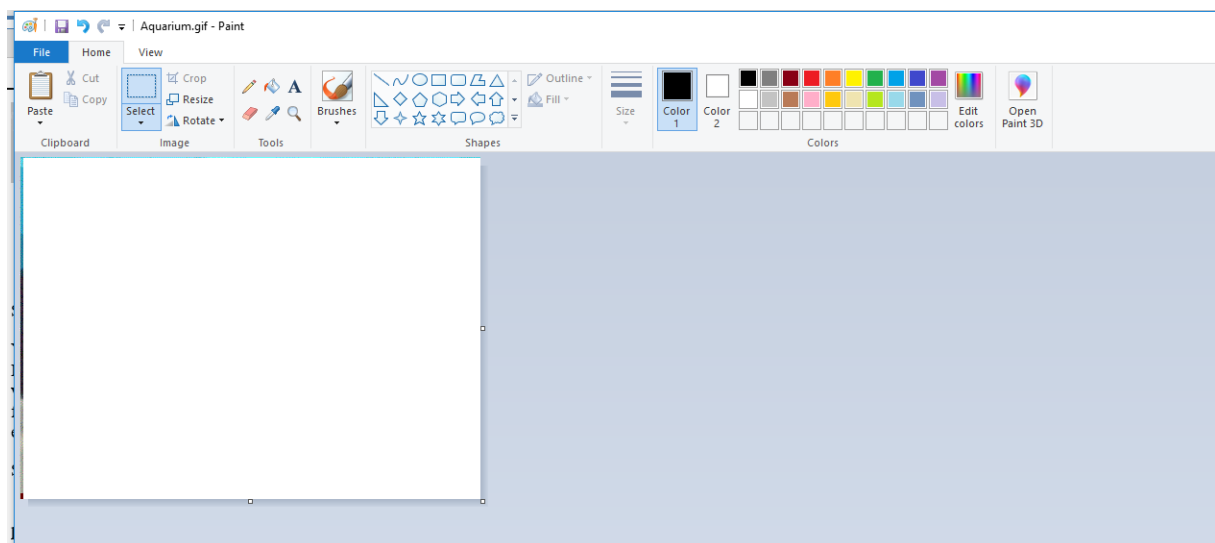
Now choose an image that you want to save as file with gif extension. (internet or other sources). Your screen shows this image.

After you choose the image that you want to save as .gif file, move the mouse arrow over the image and click right side of the mouse. Choose from the menu **copy** option.

Go to the Pant Program, click button Ctrl (hold it) and at the same time click button V on the key board. Your chosen image should be appeared on the screen of the program Paint.

Step #4. Now Option File (program Paint), choose option save as and option gif extension. When you click this option program asks you where to save this file and how to name it. You must save this file to the same directory where is located your Python file.

Now you are done.

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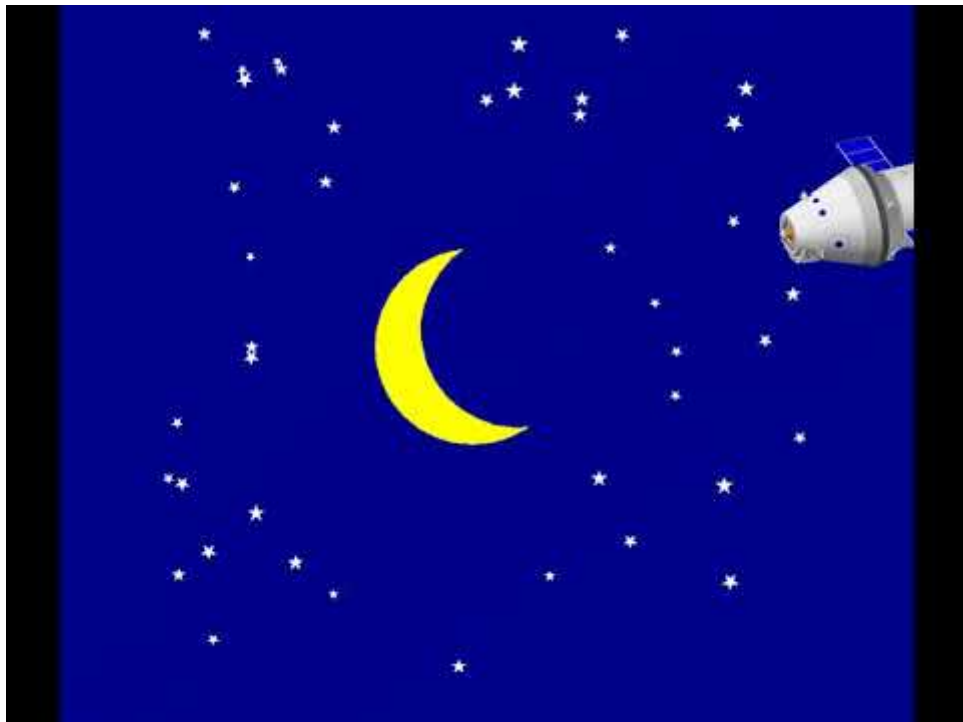2. **Example #3** (Astronaut with Shuttle in free space)

In this example we create a following Python project: astronaut out of the shuttle is moving in free space.

Static code result:
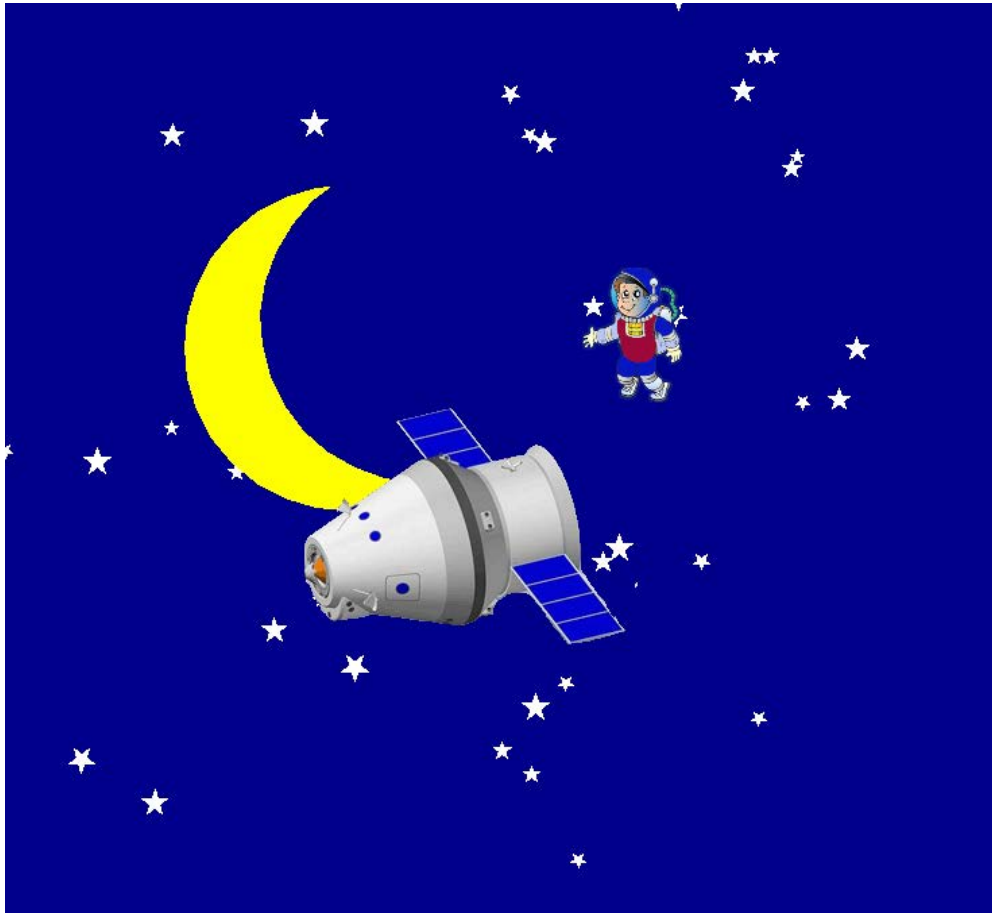
Video below shows the final result (click on the image or link to watch video)

Final code looks like:

```
1    import turtle
2    import random
3    turtle.tracer(4)
4    t=turtle.Turtle()
5    wn=turtle.Screen()
6    wn.screensize(800,800,'dark blue')
7    t.speed(10)
8    import time
9
10   # Function design of sky stars
11   def star(x,y,size):
12       t.up()
13       t.goto(x,y)
14       t.down()
15       t.color('white','white')
16       t.begin_fill()
17       t.left(36)
18       for i in range(5):
19           t.fd(size)
20           t.left(144)
21       t.end_fill()
22
23   #Draw 50 random located stars with different size
24   for i in range(50):
25       starX=random.randint(-400,400)
26       starY=random.randint(-400,400)
27       starsize=random.randint(10,20)
28       star(starX,starY,starsize)
29   t.hideturtle()
30
31   #Moon Design
32   t.up()
33   t.goto(0,-120)
34   t.down()
35   t.color('yellow','yellow')
36   t.begin_fill()
37   t.circle(120)
38   t.end_fill()
39   t.circle(120,20)
40   t.up()
41   t.fd(60)
42   t.down()
43   t.color('dark blue')
44   t.begin_fill()
45   t.circle(120)
46   t.end_fill()
47
```

```
48    #Spaseshuttle Image
49    Shuttle=turtle.Turtle()
50    image0='sputnik.gif'
51    wn.addshape(image0)
52    Shuttle.shape(image0)
53    Shuttle.penup()
54    Shuttle.goto(-600,-600)
55    Shuttle.setheading(20)
56
57    #Astronaut Image
58    image1='astronaut.gif'
59    wn.addshape(image1)
60    Astro=turtle.Turtle()
61    Astro.shape(image1)
62    Astro.up()
63
64    #Motion
65    while True:
66        Shuttle.fd(5)
67        time.sleep(0.03)
68        X=Shuttle.xcor()
69        Y=Shuttle.ycor()
70        Astro.setposition(X+90,Y+90)
71        Astro.fd(60)
72        Astro.right(5)
73
74        if abs(X-600)<10 or abs(Y-600) <10:
75            Shuttle.goto(-600,-600)
76            Astro.goto(-600,-400)
77            Shuttle.setheading(random.randint(20,70))
78
```

This code includes **two** inserted images: line #50 for sputnik and line #58 for astronaut. We have found images on Internet, then converted each of them to the files with gif extension and inserted it into the code. You find all these images with gif extension in Lesson #13, Example #3. Build this code with images and try how it works. Again, keep in mind that files: **sputnik.gif**, and **astronaut.gif** and file with main code have to be located in the same directory. If you are familiar with technique how to create gif images you can try different images with the same code. Pay attention to the lines #74-77. These lines allow us to start shuttle and astronaut motion from left side when images reach right boarder of the screen.

3. **Example #4** (Running Boy)

Code:

```
1    import turtle
2    t=turtle.Turtle()
3    t.hideturtle()
4    import time
5    wn = turtle.Screen()
6    wn.bgcolor('red')
7    wn.setup(800,800)
8    #wn.bgpic('field.gif')
9    turtle.tracer(2)
10
11   t0=turtle.Turtle()
12   t0.hideturtle()
13   t0.color('white')
14   t0.pensize(5)
15   t0.up()
16   t0.goto(-400,270)
17   t.setheading(0)
18
19   for i in range(7):
20       t0.fd(800)
21       t0.up()
22       t0.goto(-400,270-100*i)
23       t0.down()
24
25   image=['boy11.gif','boy12.gif','boy13.gif','boy14.gif']
26
27   def boy_run(img):
28       wn.addshape(img)
29       t.shape(img)
30
31   t.hideturtle()
32   t.up()
33   t.speed(1)
34   t.goto(-400,0)
35   t.setheading(0)
36   t.showturtle()
37   i=0
38   while True:
39
40       X=t.xcor()
41       if X>400:
42           t.hideturtle()
43           t.goto(-400,0)
44           t.showturtle()
45       i1=i%4
46       boy_run(image[i1])
47       t.fd(10)
48       i=i+1
49       time.sleep(0.05)
```

Take a look on this code. To generate the animation effect we have chosen four different boy images-positions that create illusion that a boy is running.
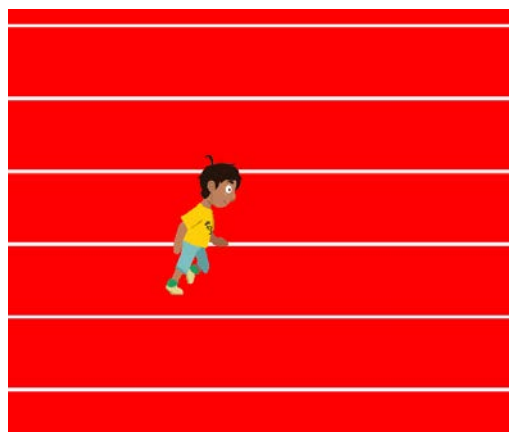

boy11.gif　　　boy12.gif　　　boy13.gif　　　boy14.gif

Each position of a boy is determined by it's own image file (line #25) and specified with list of images. You will find these four .gif images on web python.kidsgo.ca Lesson #13 and you can download corresponding files to your computer. You can name each of boy image as you want. However, you have to put corresponding image file name into the line #25. For example, lets file name of the first boy image is **b1.gif**(instead boy11.gif), file name of the second boy image is **b2.gif**(instead boy12.gif), file name of the third boy image is **b3.gif**(instead boy13.gif), and file name of the fourth boy image is **b4.gif**(instead boy14.gif). In this case, line #10 should be **image=['b1.gif ', 'b2.gif ', 'b3.gif ', 'b4.gif ']**
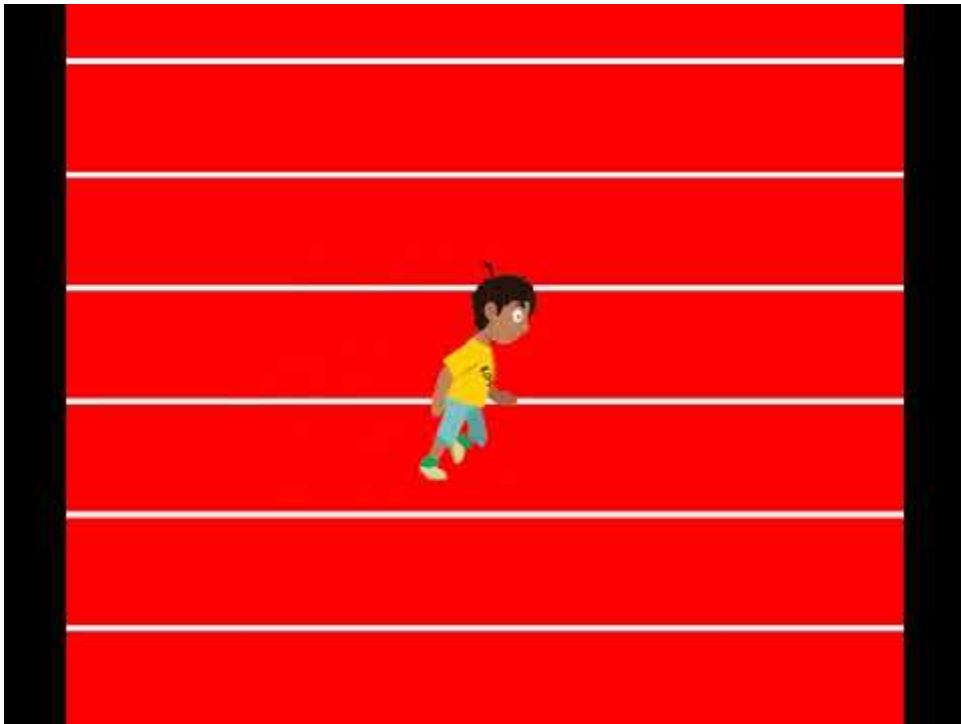
These four images are one animation cycle. In while loop this cycle is constantly repeated creating illusion that a boy is running. Pay attention to lines #45 and #46. Line #45 creates variable **i1** that takes values 0,1,2,3(only four values), boy positions could be only image [0], image [1], image [2], and image [3] only.

   Lines 41-44 are the commands that allow boy start run from the left side every time when he finishes run from the right side.

   Static code result looks like:

Video below shows the final result (click on the image or link to watch video)