



Lesson 15: Mouse and Keyboard Control (Function onclick())

Today we are going to learn to handle user events and make our programs more interactive. Event-driven programs basically do nothing, waiting until something –an event – happens. When an event does happen, they spring into action, doing whatever is necessary to handle the event. Python’s turtle module includes some functions for handling user events, including mouse clicks and keypresses.

First built into the Turtle module **function**: `wn.onscreenclick()` or shortly `wn.onclick()`

As the name suggests, this function allows us to handle events created by the user clicking on the turtle’s screen. There’s a difference between this function and the ones we’ve used and built before: the argument that we send to `wn.onscreenclick()` isn’t a value — it’s the name of another function:

```
wn.onscreenclick(t.goto)
```

Remember the `goto(x,y)` function that we’ve used to move the mouse to a certain (x, y) location on the screen? Now we’re telling the computer that when the turtle screen gets a mouse click, it should set the turtle to the position of that click on the screen. A function we pass as an argument to another function is sometimes called a *callback* function (because it gets *called back* by the other function). Notice that when we send a function as an argument to another function, the inside **function doesn’t need the parentheses after its name**.

By sending the function name `t.goto` to `wn.onscreenclick()`, we’re telling the computer what we want screen clicks to do: we want to set the position of the turtle to wherever the user clicked. Let’s try it in a short program:

!!!All codes with function *wn.screenonclick* (shortly *wn.onclick()*) operates only when you mouse click on any point of the screen!!!

1. Example #1 (`onscreenclick()` function)

```
1 import turtle
2 t = turtle.Turtle()
3 wn = turtle.Screen()
4 wn.title("How to handle mouse clicks on the window!")
5 wn.bgcolor("lightgreen")
6
7 t.color("purple")
8 t.pensize(30)
9 t.shape('square')
10
11 wn.onclick(t.goto)
```

RESULT:



This is a drawing result after mouse click in random positions of the screen. We can change the background colour of the screen, the turtle's pen colour, the width of the pen, and more.

Example #1(2)

```
import turtle
t = turtle.Turtle()
wn = turtle.Screen()
wn.title("How to handle mouse clicks on the window!")
wn.bgcolor('red')
t.color('white')
t.pensize(30)
t.shape('square')
wn.onclick(t.goto)
```



Example #1(3)

```
import turtle
t = turtle.Turtle()
wn = turtle.Screen()
wn.title("How to handle mouse clicks on the window!")
wn.bgcolor('blue')
t.color('white')
t.pensize(2)
t.shape('square')
wn.onclick(t.goto)
```



Operational code for onclick function can be written as a function:

2. Example #2

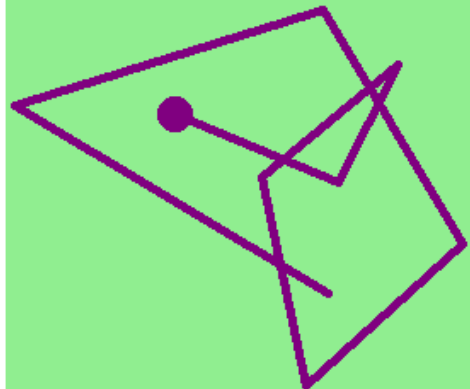
```
import turtle
t = turtle.Turtle()
wn = turtle.Screen()

wn.title("How to handle mouse clicks on the window!")

wn.bgcolor("lightgreen")
t.color("purple")
t.pensize(5)
t.shape("circle")

def h(x, y):
    t.goto(x, y)

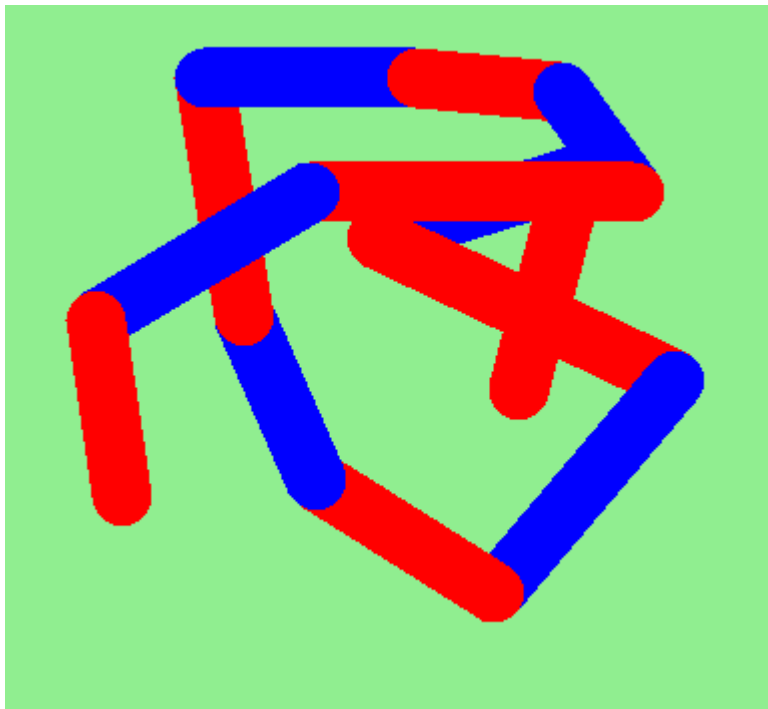
wn.onscreenclick(h)
```



In example #2 code for onscreenclick function is created using h(x,y) function.

3. Example #3

```
1 import turtle
2 t = turtle.Turtle()
3 wn = turtle.Screen()
4
5 wn.title("How to handle mouse clicks on the window!")
6
7 wn.bgcolor("lightgreen")
8
9 t.color("purple")
10 t.pensize(30)
11 t.shape("circle")
12
13 n=0
14 def h(x, y):
15     global n
16     if n%2==0:
17         t.color('red')
18     else:
19         t.color('blue')
20     t.goto(x, y)
21     n=n+1
22
23 wn.onclick(h)
```



4. Example #4

```
import turtle
t = turtle.Turtle()
wn = turtle.Screen()

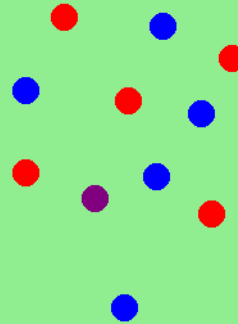
wn.title("How to handle mouse clicks on the window!")

wn.bgcolor("lightgreen")

t.color("purple")
t.pensize(30)
t.shape("circle")

q=0
def h(x, y):
    global q
    t.stamp()
    t.penup()
    t.goto(x, y)
    if q%2==0:
        t.color('red')
    else:
        t.color('blue')
    q=q+1

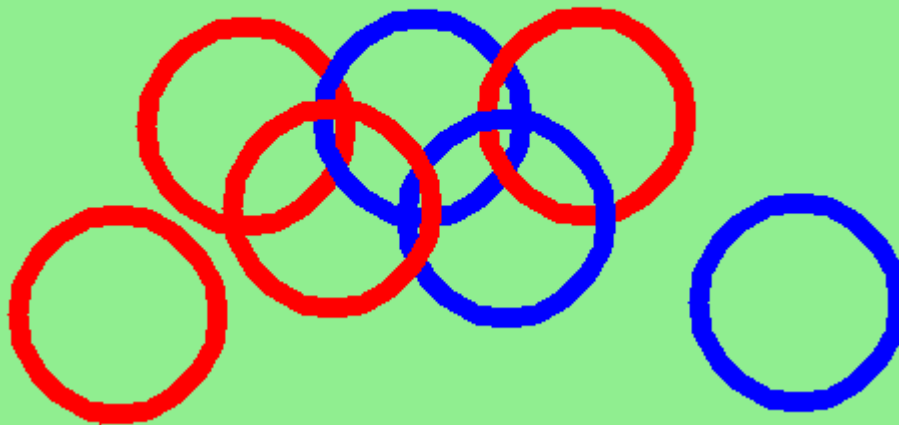
wn.onclick(h)
```



5. Example #5

```
1 import turtle
2 t = turtle.Turtle()
3 wn = turtle.Screen()
4
5 wn.title("How to handle mouse clicks on the window!")
6
7 wn.bgcolor("lightgreen")
8
9 t.color("purple")
10 t.pensize(10)
11 t.hideturtle()
12 t1=turtle.Turtle()
13 t1.up()
14 t1.hideturtle()
15 t1.goto(-300,300)
16 t1.color('red')
17 t1.write('click on any point of the the screen', font=("Arial",20,'bold'))
18 n=0
19 def h(x, y):
20     global n
21     t.penup()
22     t.hideturtle()
23     if n%2==0:
24         t.color('red')
25     else:
26         t.color('blue')
27     t.goto(x, y)
28     t.down()
29     t.showturtle()
30     t.circle(50)
31     n=n+1
32 wn.onclick(h)
33
```

click on any point of the the screen



6. Example #6

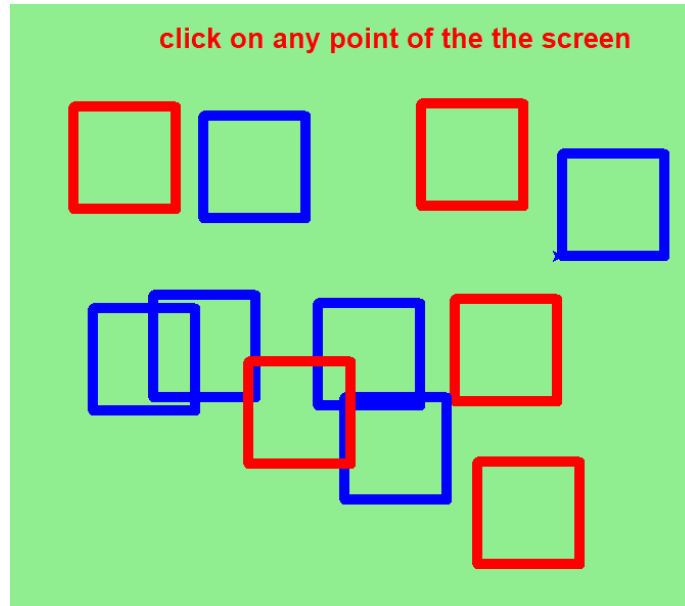
```
import turtle
t = turtle.Turtle()
wn = turtle.Screen()

wn.title("How to handle mouse clicks on the window!")

wn.bgcolor("lightgreen")

t.color("purple")
t.pensize(10)
t.hideturtle()
tl=turtle.Turtle()
tl.up()
tl.hideturtle()
tl.goto(-300,300)
tl.color('red')
tl.write('click on any point of the the screen', font=("Arial",20,'bold'))
n=0
def h(x, y):
    global n
    t.penup()
    t.hideturtle()
    if n%2==0:
        t.color('red')
    else:
        t.color('blue')
    t.goto(x, y)
    t.down()
    t.showturtle()
    #t.circle(50)
    for s in range (4):
        t.fd(100)
        t.left(90)

    n=n+1
wn.onclick(h)
```



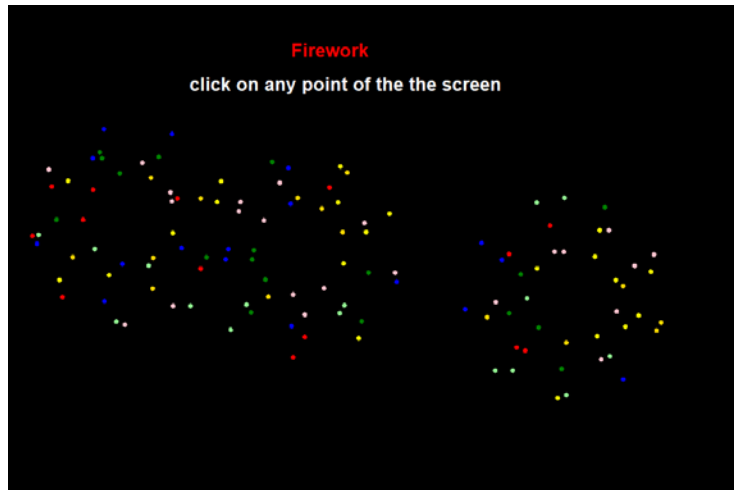
7. Example #7 (Firework)

CODE:

```

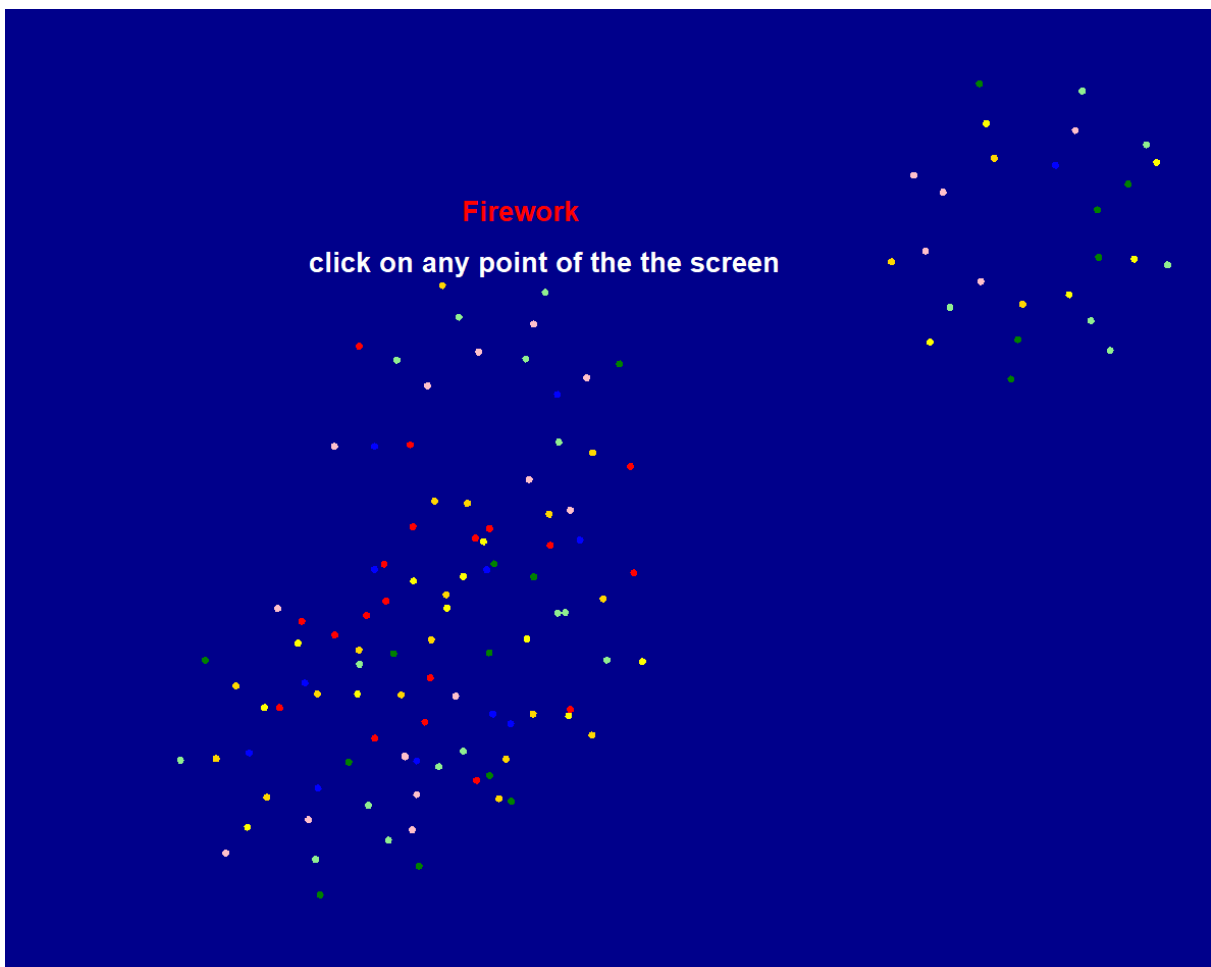
1  import turtle
2  import time
3  import random
4  wn=turtle.Screen()
5  wn.bgcolor('black')
6  t=turtle.Turtle('circle')
7  t.shapesize(0.3)
8  t.up()
9  turtle.tracer(50)
10 clr=['red','blue','gold','yellow','green','pink','lightgreen']
11 t1=turtle.Turtle()
12 t1.up()
13 t1.hideturtle()
14 t1.color('red')
15 t1.goto(-150,300)
16 t1.write('Firework', font=("Arial",20,'bold'))
17 t1.goto(-300,250)
18 t1.color('white')
19 t1.write('click on any point of the the screen', font=("Arial",20,'bold'))
20 s=-1
21 def firework(x,y):
22     global s
23     s=s+1
24     q=random.randint(5,25)
25     if s%4==0:
26         t.clear()
27         t.goto(x,y)
28         for j in range(5):
29             a=random.choice(clr)
30             t.color(a)
31             time.sleep(0.1)
32             for i in range(q):
33                 b=random.choice(clr)
34                 t.color(b)
35                 t.circle(40+20*j,40)
36                 t.stamp()
37                 t.fd(20)
38             time.sleep(0.2)
39 wn.onclick(firework)
40

```



8. Example #8 (Firework with fading screen)

RESULT:



CODE for Example #8:

```
import turtle
import time
import random
wn=turtle.Screen()
wn.bgcolor('black')
t=turtle.Turtle('circle')
t.shapesize(0.3)
t.up()
turtle.tracer(50)
clr=['red','blue','gold','yellow','green','pink','lightgreen']
tl=turtle.Turtle()
tl.up()
tl.hideturtle()
tl.color('red')
tl.goto(-150,300)
tl.write('Firework', font=("Arial",20,'bold'))
tl.goto(-300,250)
tl.color('white')
tl.write('click on any point of the the screen', font=("Arial",20,'bold'))

def firework(x,y):
    wn.bgcolor('black')
    q=random.randint(5,25)

    t.goto(x,y)
    for i in range(5):
        t.goto(random.randint(-400,400),random.randint(-400,400))
        for j in range(5):
            a=random.choice(clr)
            t.color(a)
            time.sleep(0.1)
            for i in range(q):
                b=random.choice(clr)
                t.color(b)
                t.circle(40+20*j,40)
                t.stamp()
                t.fd(20)
            #time.sleep(0.2)

    for r in range(5):
        wn.bgcolor('dark blue')
        time.sleep(0.2)
        wn.bgcolor('blue')
        time.sleep(0.2)

    wn.bgcolor('black')
    t.clear()
wn.onclick(firework)
```

9. Example #9 (Firework with RGB colour code)

```
import turtle
import time
import random
wn=turtle.Screen()
wn.bgcolor('black')
wn.colormode(255)
t=turtle.Turtle('circle')
t.shapesize(0.3)
t.up()
turtle.tracer(50)
t1=turtle.Turtle()
t1.up()
t1.hideturtle()
t1.color('red')
t1.goto(-150,300)
t1.write('Firework', font=("Arial",20,'bold'))
t1.goto(-300,250)
t1.color('white')
t1.write('click on any point of the the screen', font=("Arial",20,'bold'))

def firework(x,y):
    wn.bgcolor('black')
    q=random.randint(5,25)

    t.goto(x,y)
    for i in range(5):
        t.goto(random.randint(-400,400),random.randint(-400,400))
        for j in range(5):
            q1=random.randint(1,255)
            q2=random.randint(1,255)
            q3=random.randint(1,255)
            t.color(q1,q2,q3)
            time.sleep(0.1)
            for i in range(q):
                q4=random.randint(1,255)
                q5=random.randint(1,255)
                q6=random.randint(1,255)
                t.color(q4,q5,q6)
                t.circle(40+20*j,40)
                t.stamp()
                t.fd(20)
            #time.sleep(0.2)

    for r in range(5):
        wn.bgcolor('dark blue')
        time.sleep(0.2)
        wn.bgcolor('blue')
        time.sleep(0.2)

    wn.bgcolor('black')
    t.clear()
wn.onclick(firework)
```

10. Example #10

CODE:

```
import turtle
import random
wn=turtle.Screen()
turtle.tracer(2,5)
t=turtle.Turtle()
turtle.bgcolor('black')
turtle.colormode(255)
t.goto(0,-400)
t.shapesize(1)
t.pensize(2)
t.hideturtle()
q=['red','blue','yellow','green','white','gray','violet','pink']

t1=turtle.Turtle()
t1.up()
t1.hideturtle()
t1.color('red')
t1.goto(-150,300)
t1.write('Firework', font=("Arial",20,'bold'))
t1.goto(-300,250)
t1.color('white')
t1.write('click on any point of the the screen', font=("Arial",20,'bold'))

def motion(delta,angle,clr):
    t.fd(delta)
    t.back(delta)
    t.rt(angle)
    t.color(clr)

def firework(x,y):
    t.up()
    t.clear()
    t.goto(x,y)
    t.down()
    for i in range(20):
        t.penup()
        a=random.randint(0,255)
        b=random.randint(0,255)
        c=random.randint(0,255)
        t.pencolor(a,b,c)
        u=random.randint(50,350)
        t.setheading(90)
        d=random.randint(100,600)
        t.fd(d)
        t.pendown()
        t.color(random.choice(q))
        if i%2==0:
            t.circle(-u,150)
        if i%2>0:
            t.circle(u,150)
        t.setheading(-90)
        t.pensize(1)
        motion(50,45,'red')
        motion(50,-45,'blue')
        motion(50,-45,'yellow')
        motion(50,-22.5,'green')
        motion(50,130,'gold')
        t.penup()
        t.pensize(2)
        t.goto(x,y)
wn.onclick(firework)
```

RESULT: (You have to click on the screen)

