

Program To Show How to Draw a Grid and Determine Where the Mouse is Clicked

This program will draw a grid in a window. It will allow the user to “click” the mouse on the grid. If the left mouse button is pressed, the x and y position of the mouse will be outputted in the Idle window and on the tkinter window . If the right mouse button is pressed, the row and column position of the mouse will be outputted on the tkinter window and the colour of the square will change. If the “a” key is pressed, a message will be outputted on the Idle window. This example explores binding events like pressing a keyboard key or clicking a mouse to “action” functions to do something. For more information about this, study the following website:

- <http://effbot.org/tkinterbook/tkinter-events-and-bindings.htm>

Code

from tkinter import *

def createGrid ():

""" Draws an orange grid using the constants GRIDSIZE and SQUARESIZE constants """

for row in range (0,GRIDSIZE):

for column in range (0,GRIDSIZE):

**canvas.create_rectangle (column* SQUARESIZE, row* SQUARESIZE, column* SQUARESIZE+ SQUARESIZE, row *
SQUARESIZE+SQUARESIZE, fill = "orange", outline = "black") # All on one line**

def whereIsTheMouseXY (event):

"""Outputs the mouse position x and y coordinates on the Idle window and the tkinter canvas.

event is an action from the user (ie. mouse click or keyboard press). It is interpreted by the "event listener"

This function is binded (joined) with the click of the left mouse button - <Button 1>"""

canvas.create_rectangle (50,450,550,550,fill = "white", outline = "black")

print ("Clicked at", event.x, event.y) *# Outputs the x and y position of the mouse click on the Idle window*

stringOutput = "Clicked at " + str (event.x) + ", " + str (event.y) *# Concatenates the info into a string to use the create_text function*

canvas.create_text (300,500, text = stringOutput, fill = 'blue', font = ('verdana',20)) *#Outputs the mouse positon on the canvas*

def whereIsTheMouseRowColumn (event):

"""Outputs the row and column using the x and y coordinates of the mouse position on the Idle window and the tkinter canvas.

event is an action from the user (ie. mouse click or keyboard press). It is interpreted by the "event listener"

This function is binded (joined) with the click of the right mouse button - <Button 3>"""

print ("clicked at", event.x, event.y)

canvas.create_rectangle (50,450,550,550, fill = "white", outline = "black")

row = event.y // SQUARESIZE *# Calculates the row using the y coordinate of the mouse click*

column = event.x // SQUARESIZE *# Calculates the column using the x coordinate of the mouse click*

```
stringOutput = "Clicked at row " + str (row)+" and column " + str (column)           # Concatenates the info into a string
canvas.create_text (300, 500, text = stringOutput, fill='blue', font = ('verdana', 20)) #Outputs the mouse position on the canvas
```

```
canvas.create_rectangle (column * SQUARESIZE, row * SQUARESIZE, column * SQUARESIZE + SQUARESIZE, row * SQUARESIZE+SQUARESIZE,
    fill = "pink" , outline = "black")      # On a single line
```

```
def outputKey (event):
```

```
    """Outputs a message on the Idle window - used to show binding keyboard events.
    event is an action from the user (ie. mouse click or keyboard press). It is interpreted by the "event listener"
    This function is binded (joined) with the user pressing the 'a' key on the keyboard"""
```

```
    print ("User inputted the 'a' key")
```

% Mainline

Constants store data like variables but they are not changed in the program. The name is often all in capitals to make them distinguishable from variables

```
SQUARESIZE = 30      # A constant which is the size of each square in pixels.
```

```
GRIDSIZE =5          # A constant which is the number of rows and columns in the grid
```

```
root=Tk()             # Creates a tkinter object (ie. starts tkinter)
```

```
canvas = Canvas (width = 600, height = 600, background = "white")           # Draws a surface called 'canvas' to display our graphics
canvas.pack ()          # Tells the computer to get the canvas (surface) ready
```

```
# Binds (connects) events to specific void functions created above
```

```
root.bind ("<Button-1>", whereIsTheMouseXY)      # If user presses left mouse button, function 'whereIsTheMouseXY' is called
```

```
root.bind ("<Button-3>", whereIsTheMouseRowColumn)      # If user presses right mouse button, function 'whereIsTheMouseRowColumn' is called
```

```
root.bind ("<a>" , outputKey)  # If user presses the 'a' key, function 'outputKey' is called
```

```
# Functions which are executed when the program is run
```

```
createGrid ()  # Calls the function to call the grid
```

```
root.mainloop ()  # The event listener. This built in function "listens" for an event, identifies the event and then calls the appropriate binded function
```