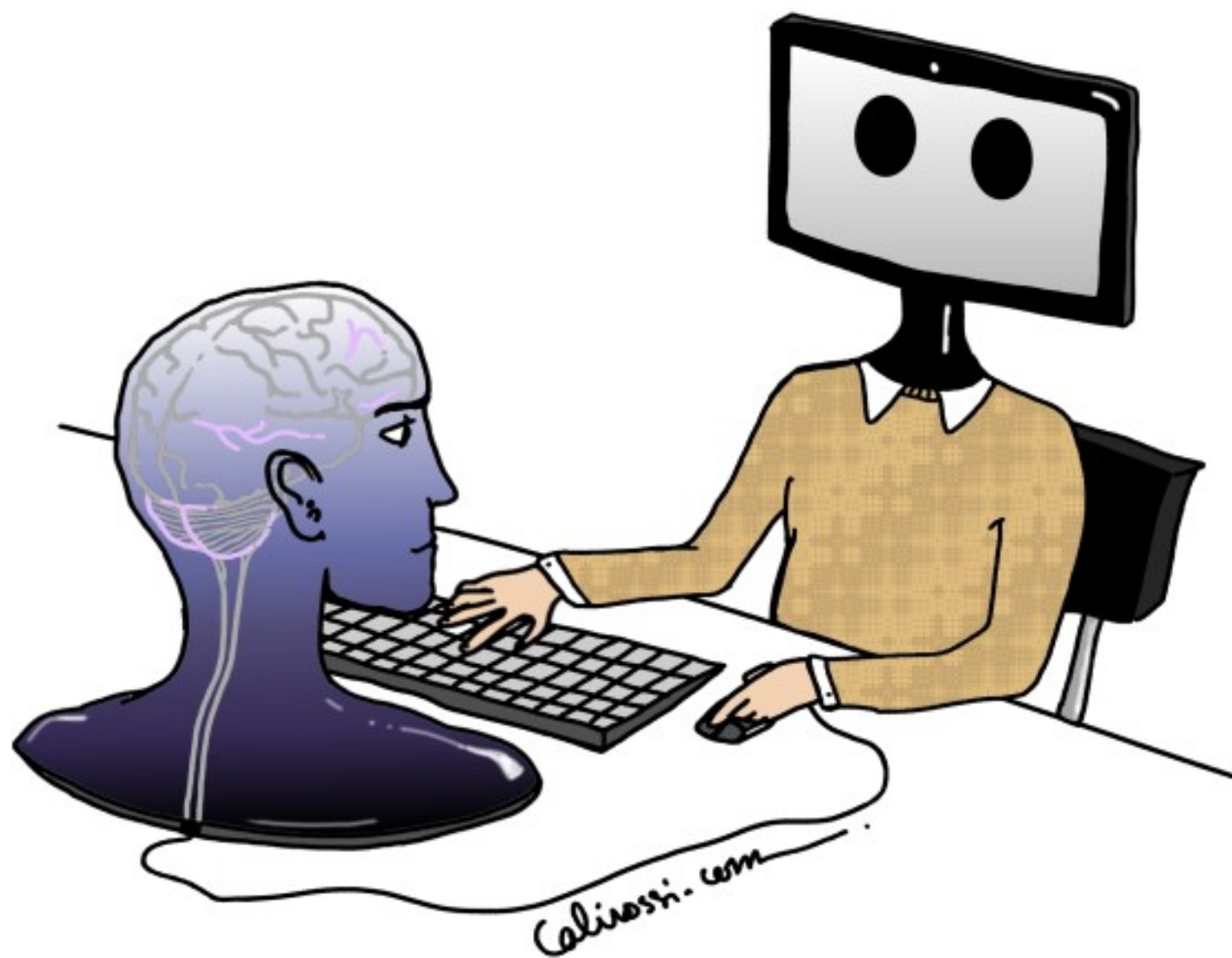


# SC101

## Lecture 7

# Python dict

# Computer Memory



# Stack and Heap



0x10A 0xFFF 0x891 0xE39 0x101 0x4FC





0x10A 0xFFFF 0x891 0xE39 0x101 0x4FC



- Object Types
  - A. GOval
  - B. GRect
  - C. Robot
  - D. BreakoutGraphics

- Data Structure
  - A. list
  - B. dict



- Primitive Types
  - A. int
  - B. float
  - C. bool



```
def main():  
    print('-----')  
    a = 0  
    plus_one(a)  
    print(a)  
    print('-----')
```

```
/usr/local/bin/python3.7 /Users/jerry-liao/Desktop/交大材料/
```

```
Process finished with exit code 0
```

```
def main():  
    print('-----')  
    a = 0  
    plus_one(a)  
    print(a)  
    print('-----')
```

```
/usr/local/bin/python3.7 /Users/jerry-liao/Desktop/交大材料/
```

```
-----
```

```
Process finished with exit code 0
```

```
def main():  
    print('-----')  
    a = 0  
    plus_one(a)  
    print(a)  
    print('-----')
```

0  
a

```
/usr/local/bin/python3.7 /Users/jerryliao/Desktop/交大材料/
```

```
-----
```

```
Process finished with exit code 0
```

```
def main():  
    print('-----')  
    a = 0  
    plus_one(a)  
    print(a)  
    print('-----')
```

0  
a

```
/usr/local/bin/python3.7 /Users/jerryliao/Desktop/交大材料/
```

```
-----
```

```
Process finished with exit code 0
```

```
def main():
```

```
def plus_one(a):
```

```
    a += 1
```



a

```
/usr/local/bin/python3.7 /Users/jerry-liao/Desktop/交大材料/
```

```
-----
```

```
Process finished with exit code 0
```

```
def main():
```

```
def plus_one(a):
```

```
    a += 1
```

0

a

```
/usr/local/bin/python3.7 /Users/jerryliao/Desktop/交大材料/
```

```
-----
```

```
Process finished with exit code 0
```

```
def main():
```

```
def plus_one(a):
```

```
    a += 1
```

1

a

```
/usr/local/bin/python3.7 /Users/jerry-liao/Desktop/交大材料/
```

```
-----
```

```
Process finished with exit code 0
```



```
def main():  
    print('-----')  
    a = 0  
    plus_one(a)  
    print(a)  
    print('-----')
```

0  
a

```
/usr/local/bin/python3.7 /Users/jerryliao/Desktop/交大材料/
```

```
-----
```

```
Process finished with exit code 0
```

```
def main():  
    print('-----')  
    a = 0  
    plus_one(a)  
    print(a)  
    print('-----')
```

0  
a

```
/usr/local/bin/python3.7 /Users/jerryliao/Desktop/交大材料/
```

```
-----
```

```
0
```

```
Process finished with exit code 0
```

```
def main():  
    print('-----')  
    a = 0  
    plus_one(a)  
    print(a)  
    print('-----')
```

0

a

```
/usr/local/bin/python3.7 /Users/jerryliao/Desktop/交大材料/
```

```
-----
```

```
0
```

```
-----
```

```
Process finished with exit code 0
```

```
window = GWindow()
```

```
def main():
```

```
    rect = GRect(100, 100)
```

```
    rect.filled = True
```

```
    rect.fill_color = 'green'
```

```
    window.add(rect, 0, 0)
```

```
    change_color(rect)
```

```
def change_color(rect):
```

```
    rect.fill_color = 'magenta'
```



rect

```
window = GWindow()
```

```
def main():
```

```
    rect = GRect(100, 100)
```

```
    rect.filled = True
```

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    window.add(rect, 0, 0)
```

```
    change_color(rect)
```

```
def change_color(rect):
```

```
    rect.fill_color = 'magenta'
```



rect

GRect (100, 100)

0x100



```
window = GWindow()
```

```
def main():
```

```
    rect = GRect(100, 100)
```

```
    rect.filled = True
```

```
    rect.fill_color = 'green'
```

```
    window.add(rect, 0, 0)
```

```
    change_color(rect)
```

```
def change_color(rect):
```

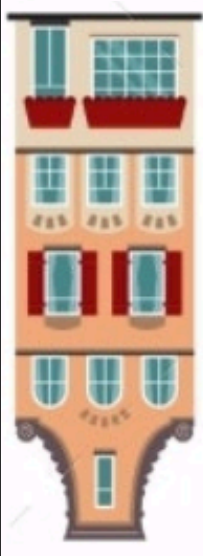
```
    rect.fill_color = 'magenta'
```



rect

GRect (100, 100)

0x100



width=100

height=100



```
window = GWindow()
```

```
def main():
```

```
    rect = GRect(100, 100)
```

```
    rect.filled = True
```

```
    rect.fill_color = 'green'
```

```
    window.add(rect, 0, 0)
```

```
    change_color(rect)
```

```
def change_color(rect):
```

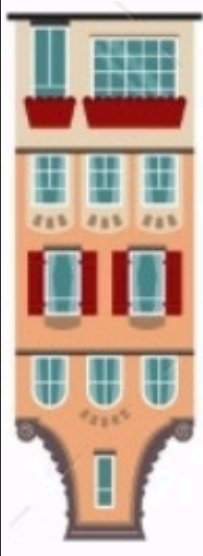
```
    rect.fill_color = 'magenta'
```



rect

GRect (100, 100)

0x100



width=100

height=100

filled=True

```
window = GWindow()

def main():
    rect = GRect(100, 100)
    rect.filled = True
    rect.fill_color = 'green'
    window.add(rect, 0, 0)
    change_color(rect)

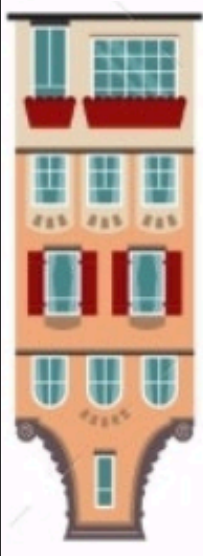
def change_color(rect):
    rect.fill_color = 'magenta'
```



rect

GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='green'

```
window = GWindow()
```

```
def main():
```

```
    rect = GRect(100, 100)
```

```
    rect.filled = True
```

```
    rect.fill_color = 'green'
```

```
    window.add(rect, 0, 0)
```

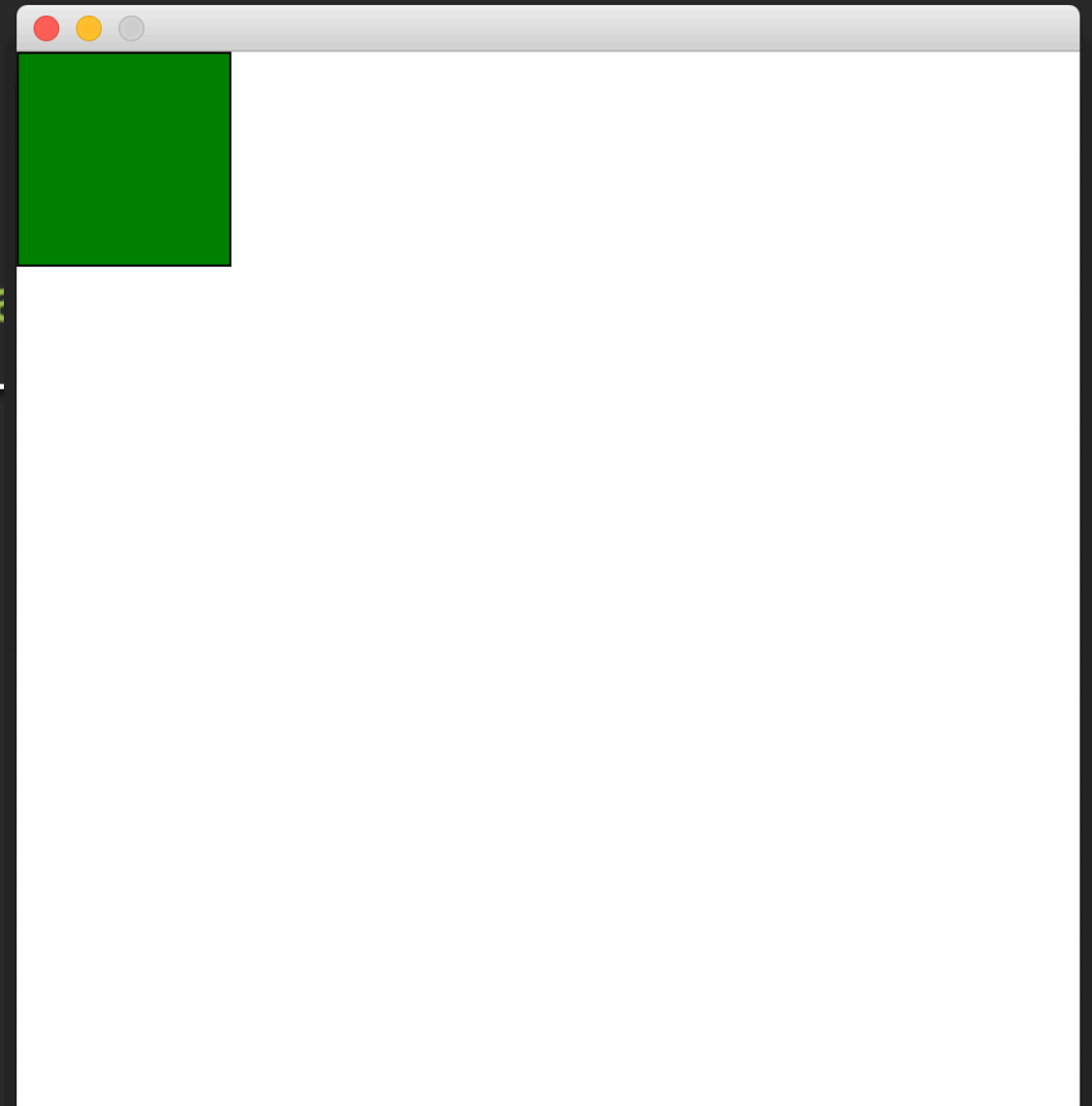
```
    change_color(rect)
```

```
def change_color(rect):
```

```
    rect.fill_color = 'ma
```

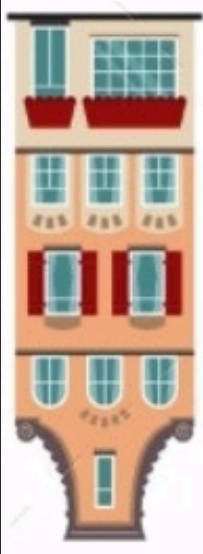


rect



GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='green'

```
window = GWindow()
```

```
def main():
```

```
    rect = GRect(100, 100)
```

```
    rect.filled = True
```

```
    rect.fill_color = 'green'
```

```
    window.add(rect, 0, 0)
```

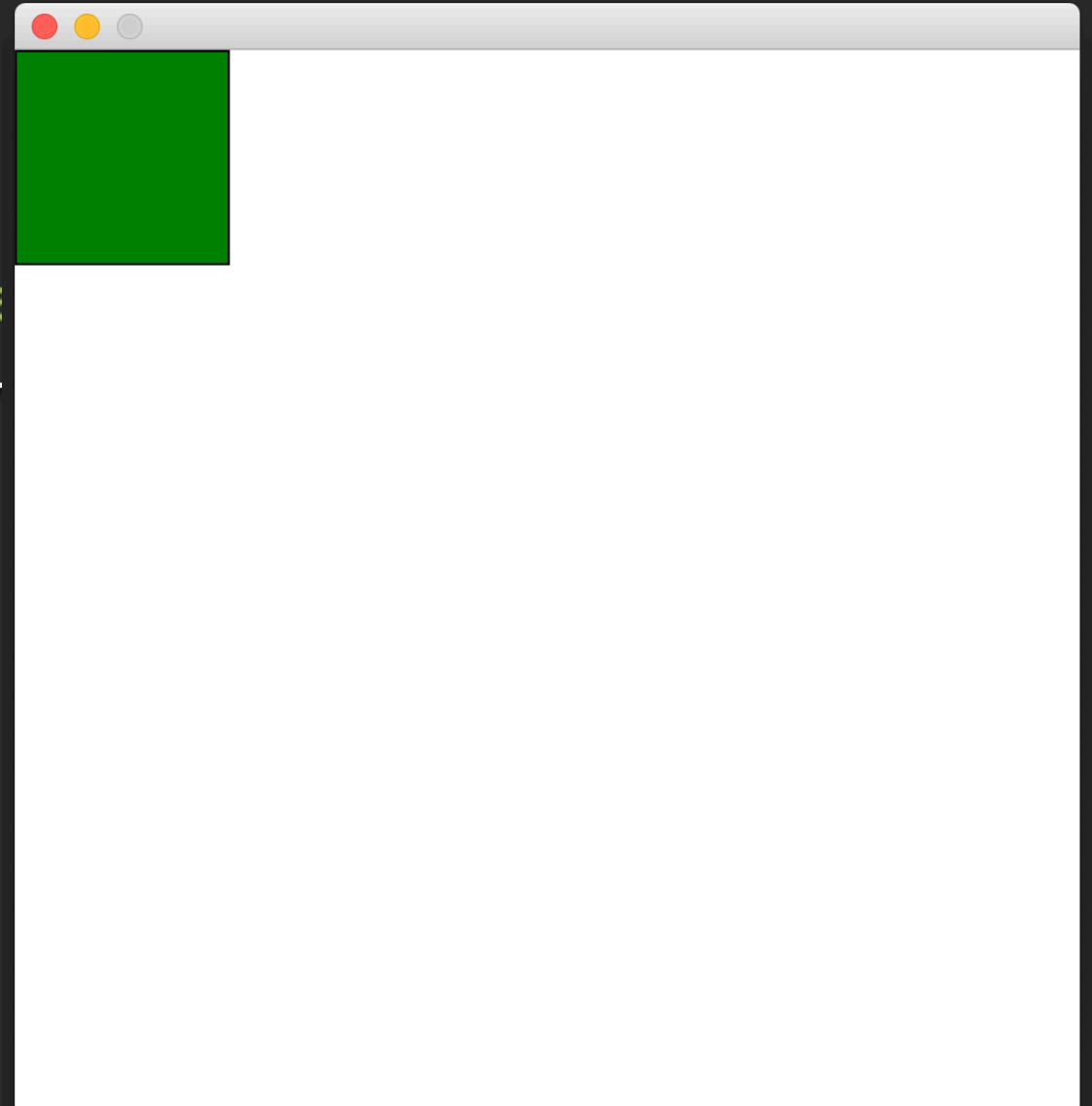
```
    change_color(rect)
```



rect

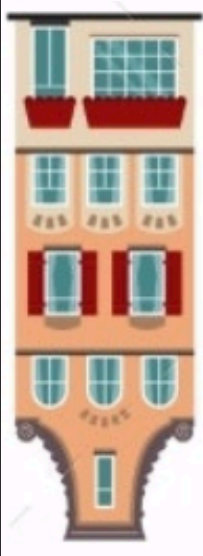
```
def change_color(rect):
```

```
    rect.fill_color = 'ma
```



GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='green'

```
window = GWindow()
```

```
def main():
```

```
def change_color(rect):
```

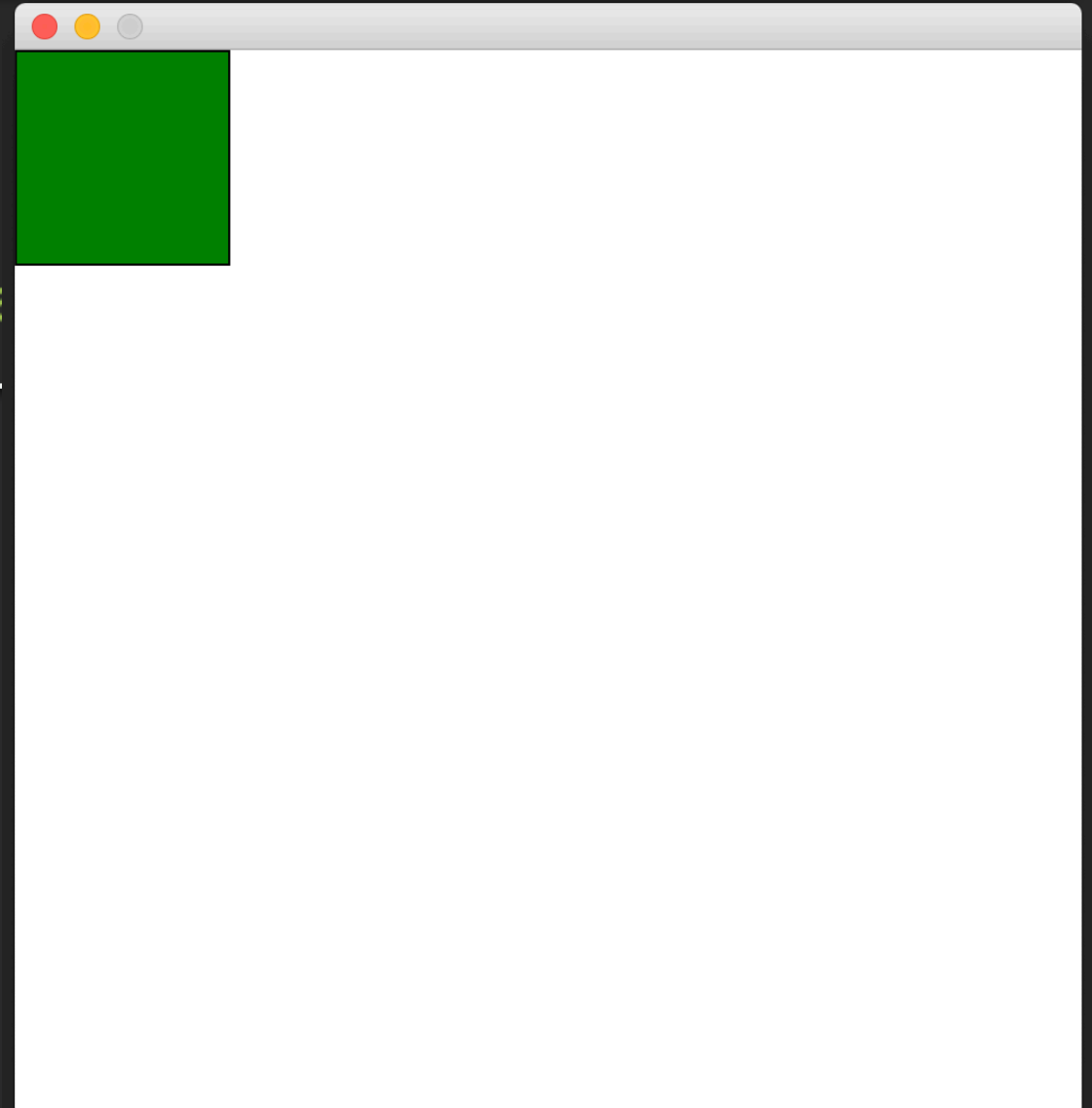
```
    rect.fill_color = 'magenta'
```



rect

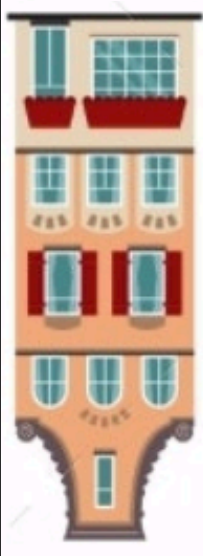
```
def change_color(rect):
```

```
    rect.fill_color = 'ma
```



GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='green'

```
window = GWindow()
```

```
def main():
```

```
def change_color(rect):
```

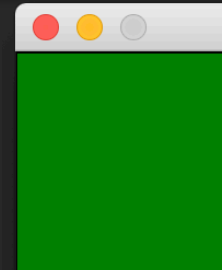
```
    rect.fill_color = 'magenta'
```



rect

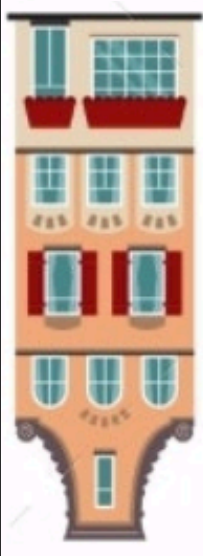
```
def change_color(rect):
```

```
    rect.fill_color = 'ma
```



GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='green'

```
window = GWindow()
```

```
def main():
```

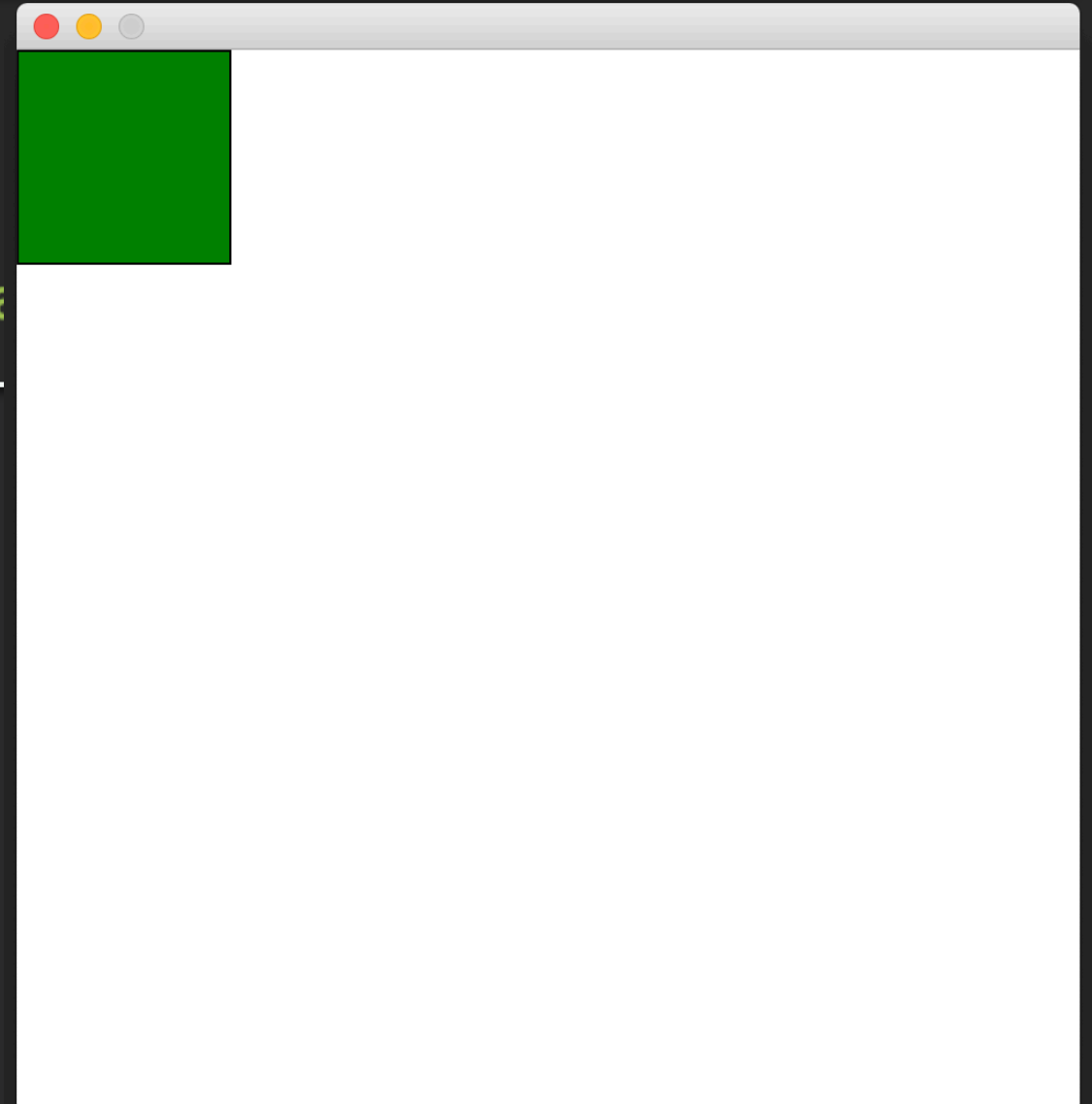
```
def change_color(rect):
```

```
    rect.fill_color = 'magenta'
```



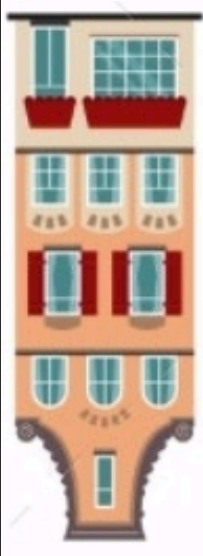
rect

```
def change_color(rect):  
    rect.fill_color = 'ma
```



GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='magenta'



```
window = GWindow()
```

```
def main():
```

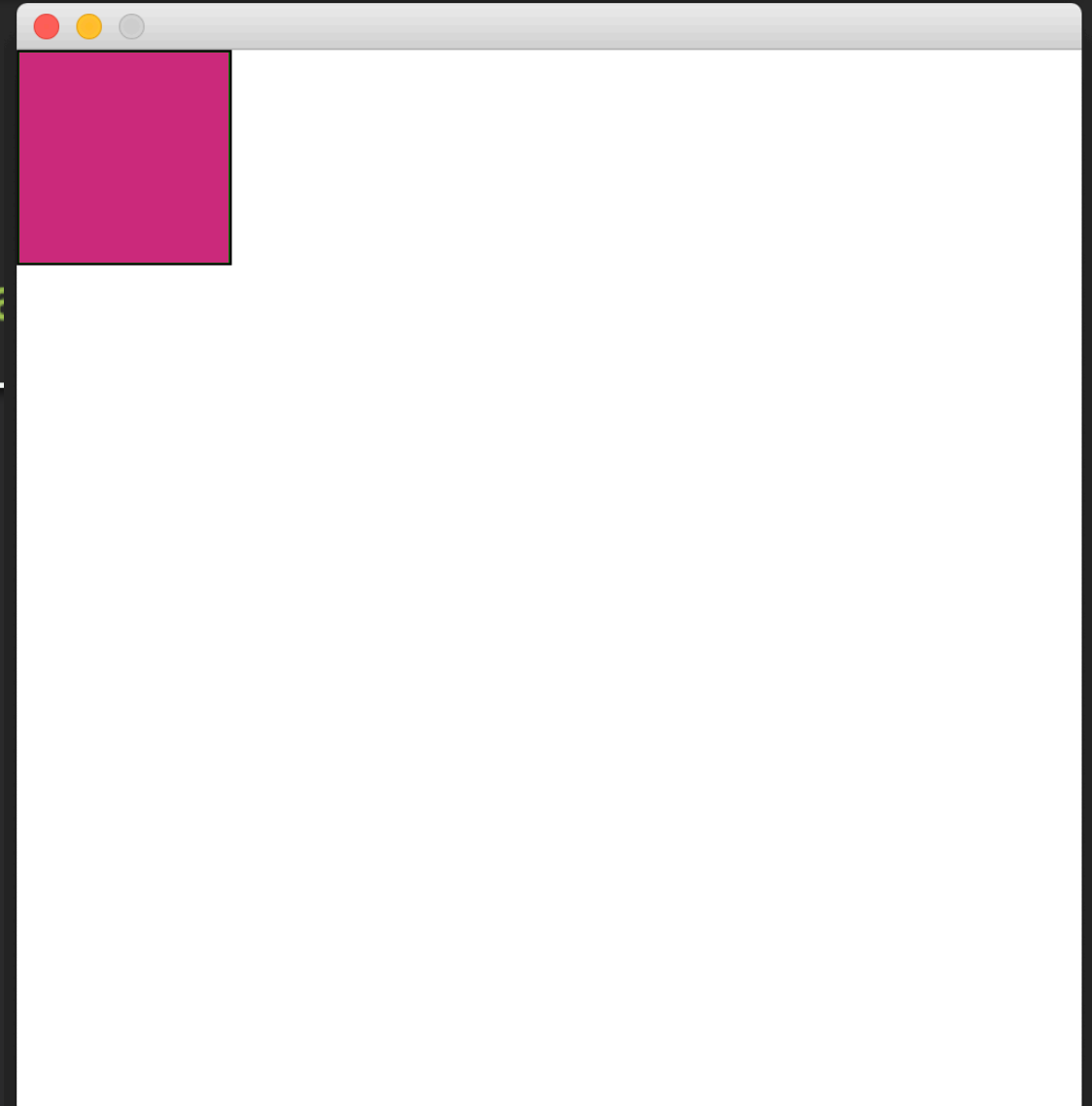
```
def change_color(rect):
```

```
    rect.fill_color = 'magenta'
```



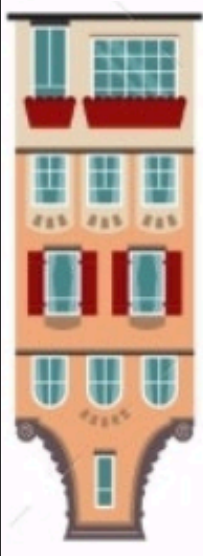
rect

```
def change_color(rect):  
    rect.fill_color = 'magenta'
```



GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='magenta'

```
window = GWindow()
```

```
def main():
```

```
    rect = GRect(100, 100)
```

```
    rect.filled = True
```

```
    rect.fill_color = 'green'
```

```
    window.add(rect, 0, 0)
```

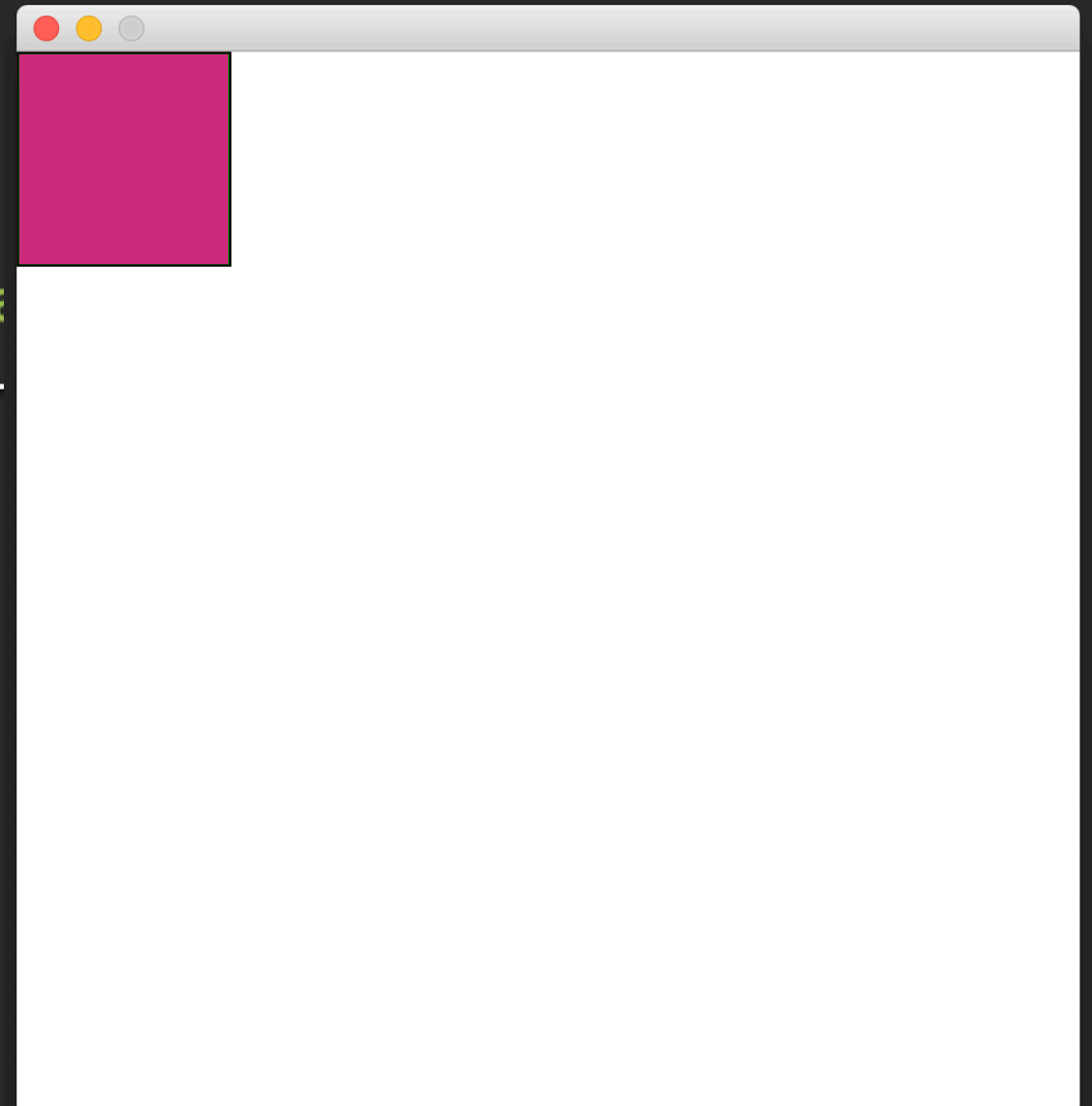
```
    change_color(rect)
```



rect

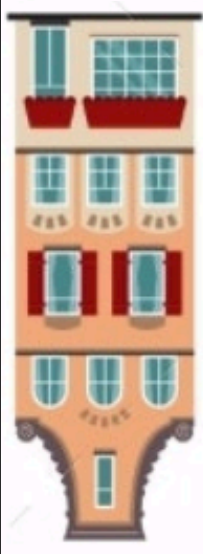
```
def change_color(rect):
```

```
    rect.fill_color = 'magenta'
```



GRect (100, 100)

0x100



width=100

height=100

filled=True

fill\_color='green'

0x10A 0xFFF 0x891 0xE39 0x101 0x4FC



# Pass by Reference

# Pass by Value



```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

?

```
def main():
```

```
    rect1 = GRect(100, 100)
```

```
    rect2 = GRect(100, 100)
```

```
    if rect1 == rect2:
```

```
        | print('They are the same!')
```

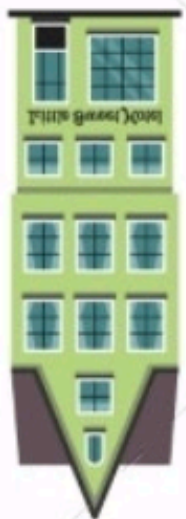
```
    else:
```

```
        | print('They are different!')
```

```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

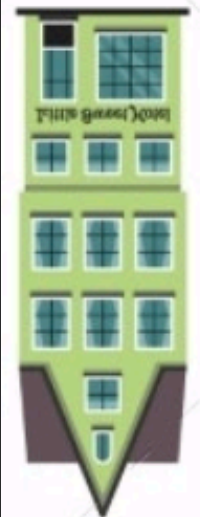
0x100





```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

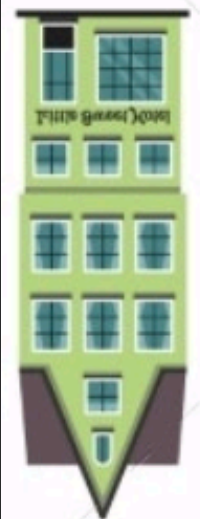
0x100



rect1

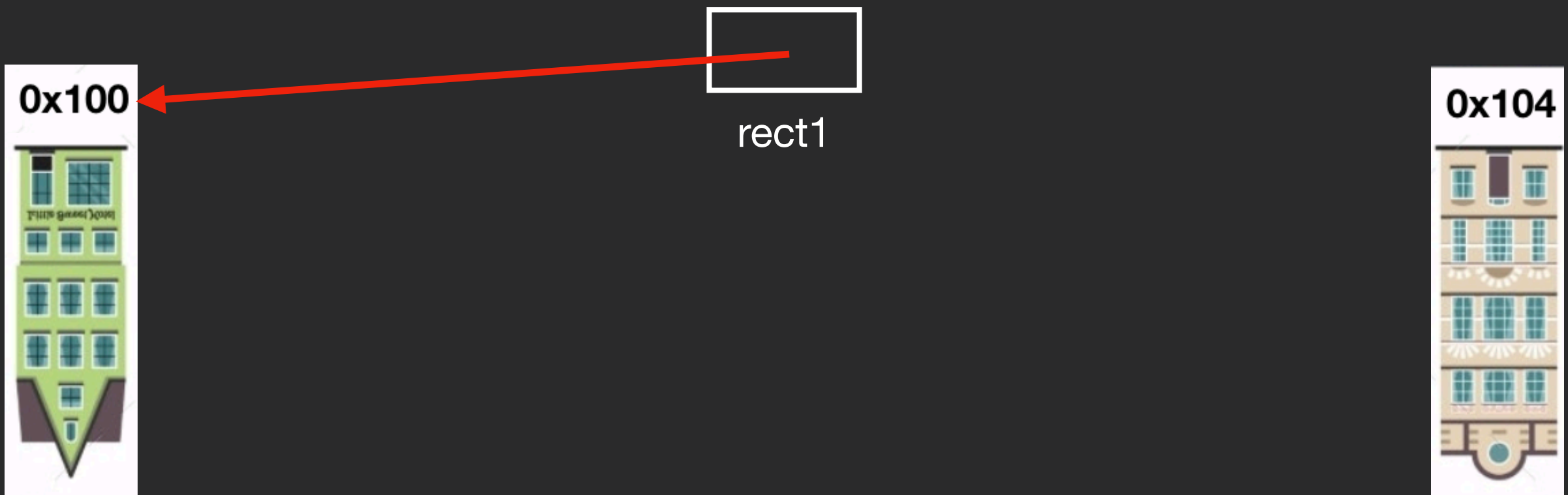
```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

0x100

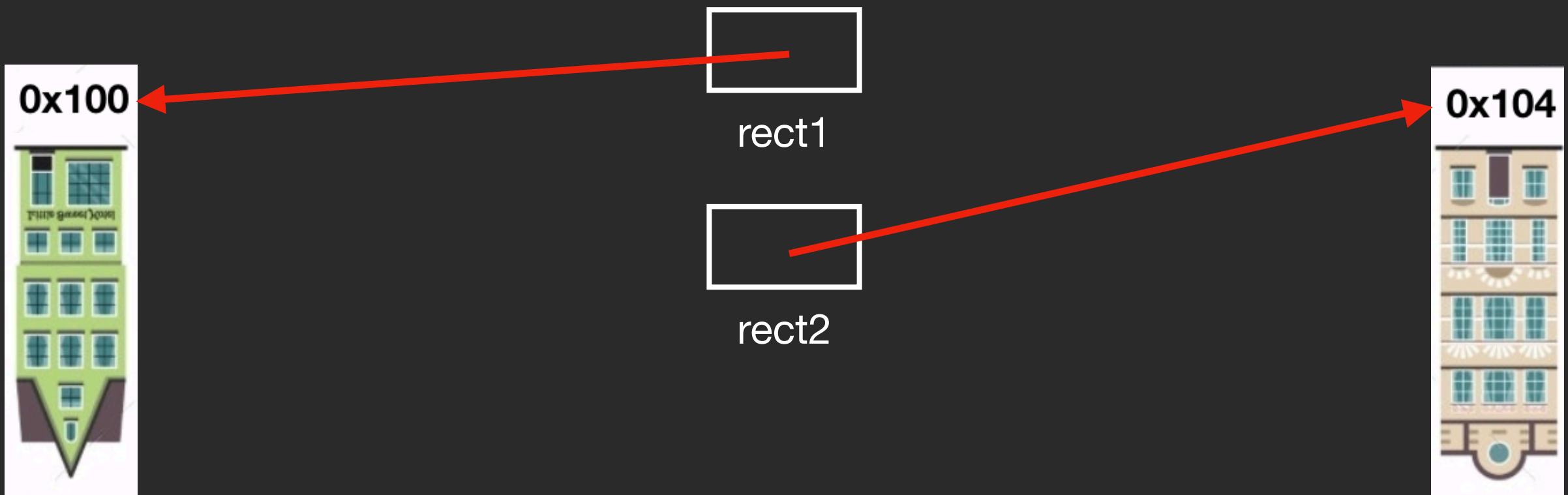


rect1

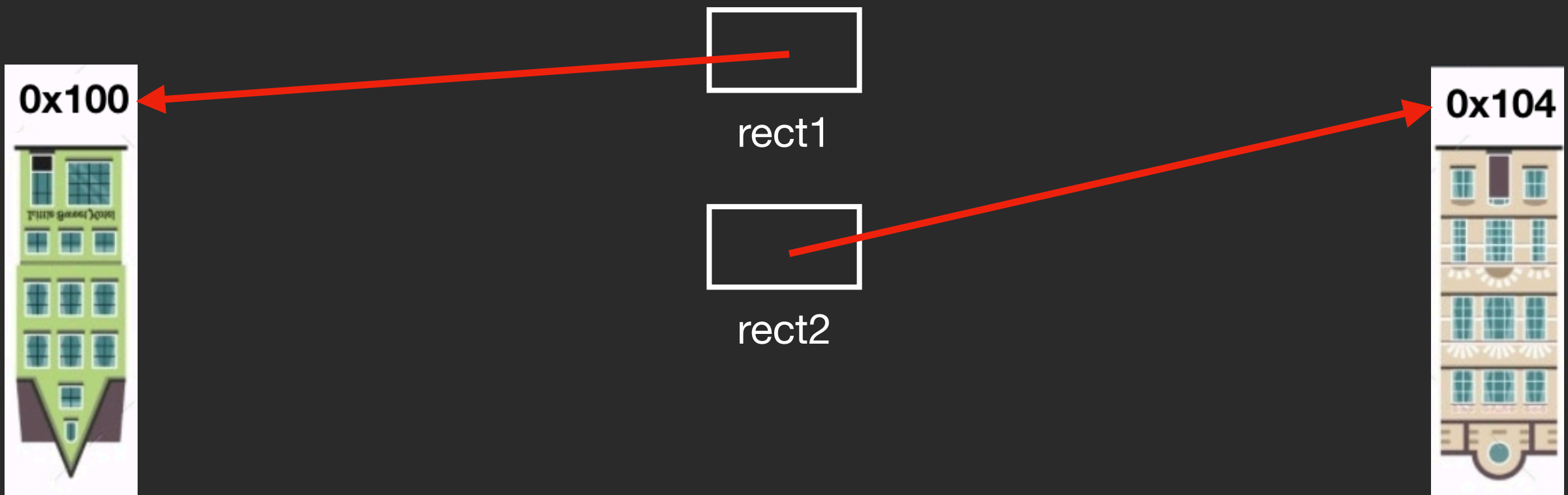
```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```



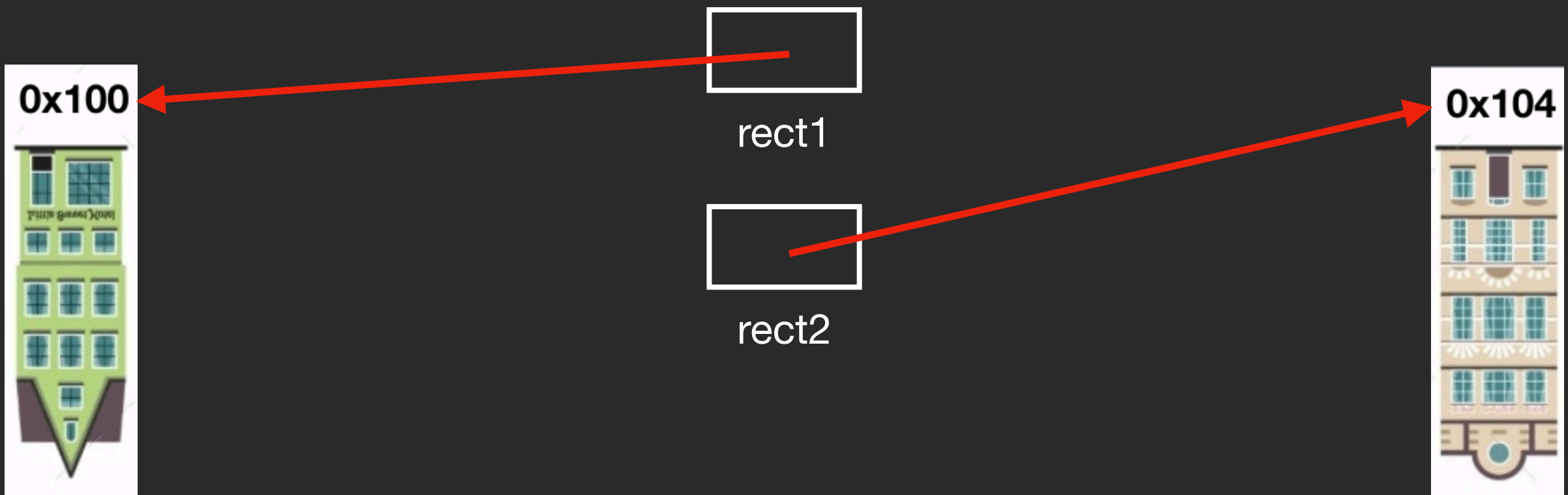
```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```



```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```



```
def main():  
    rect1 = GRect(100, 100)  
    rect2 = GRect(100, 100)  
    if rect1 == rect2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```



```
def main():  
    num1 = 101  
    num2 = 101  
    if num1 == num2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

```
def main():  
    num1 = 101  
    num2 = 101  
    if num1 == num2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

101

num1



```
def main():  
    num1 = 101  
    num2 = 101  
    if num1 == num2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

101

num1

101

num2

```
def main():  
    num1 = 101  
    num2 = 101  
    if num1 == num2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

101

num1

101

num2

```
def main():  
    num1 = 101  
    num2 = 101  
    if num1 == num2:  
        print('They are the same!')  
    else:  
        print('They are different!')
```

101

num1

101

num2