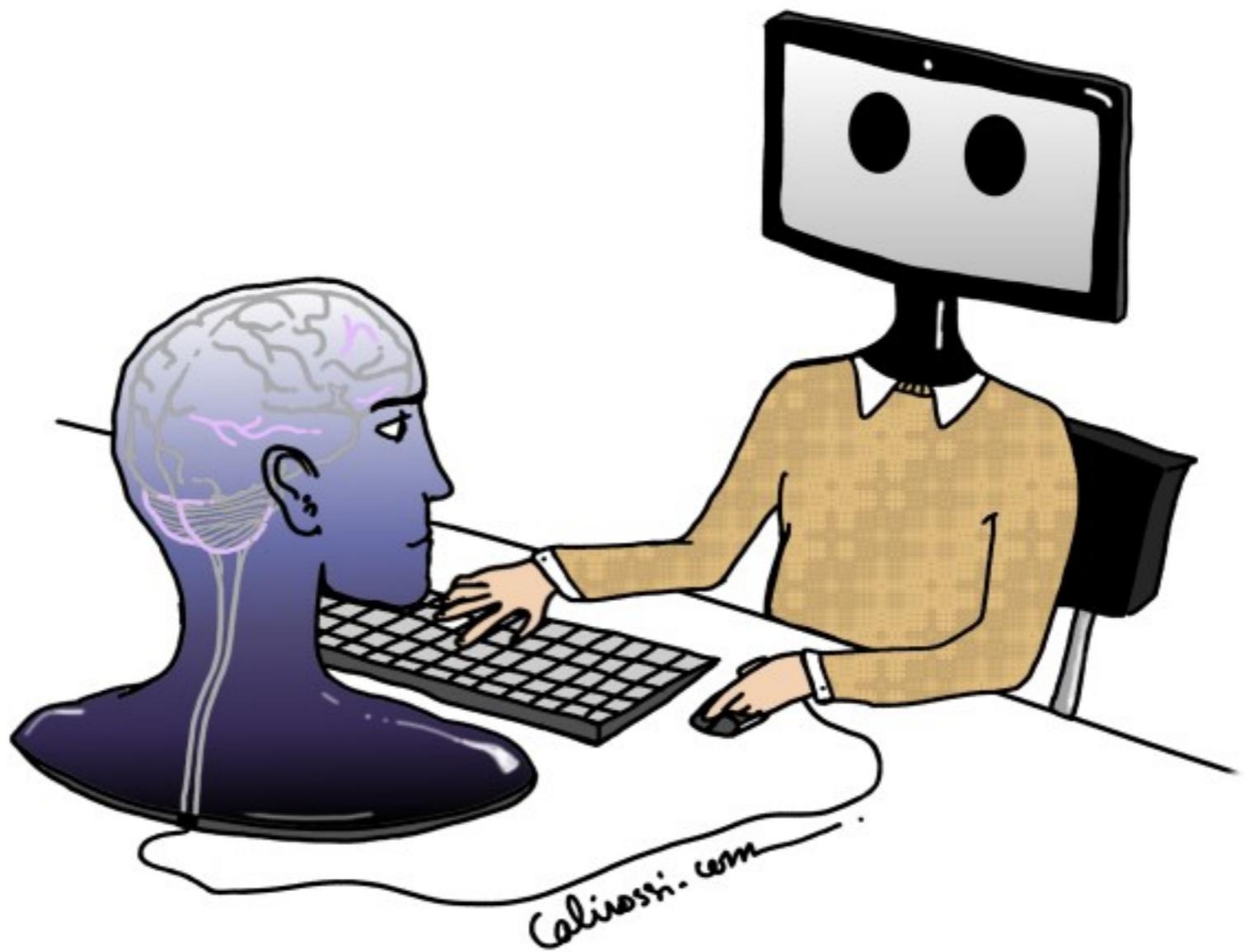


SC101

Week 4

Python dict

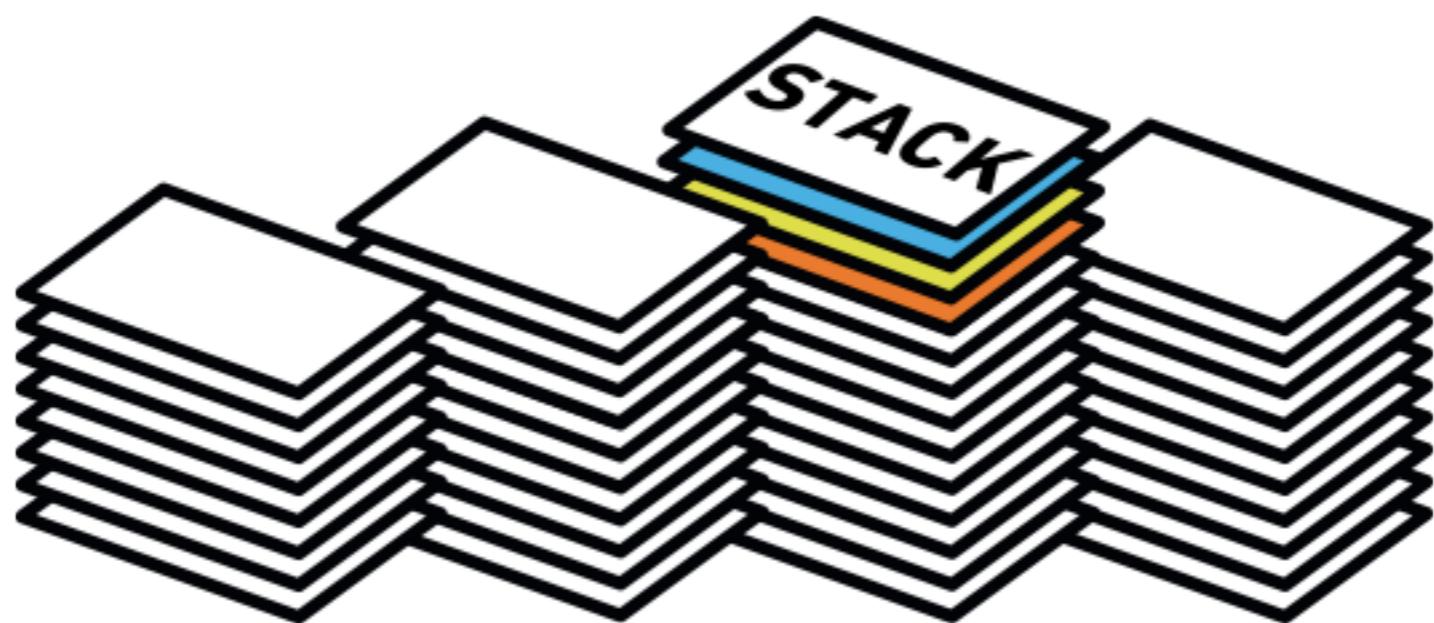
Computer Memory



Stack and Heap



0x10A 0xFFFF 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/jerryliao/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/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():
    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/jerryliao/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/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():
    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
    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
    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



```
window = GWindow()

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

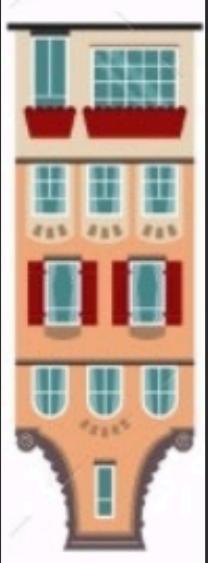
def change_color(rect):
    rect.fill_color = 'magenta'
```



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)

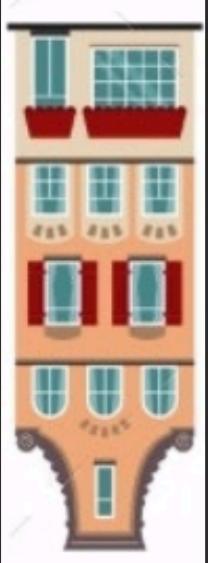
def change_color(rect):
    rect.fill_color = 'magenta'
```



rect

GRect (100, 100)

0x100



width=100
height=100
x = 0
y = 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'
```

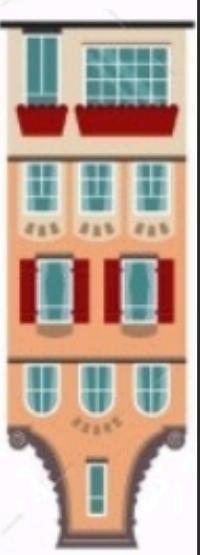


rect

GRect (100, 100)

0x100

width=100
height=100
x = 0
y = 0
filled=True

A small house icon with a red roof and orange body, used as a visual representation of the GRect object.

```
window = GWindow()

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

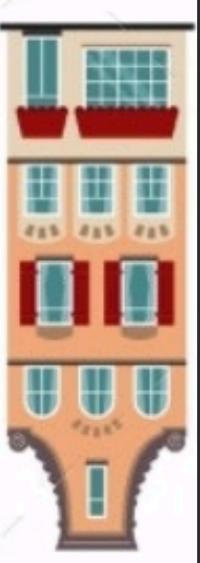
def change_color(rect):
    rect.fill_color = 'magenta'
```



rect

GRect (100, 100)

0x100



width=100
height=100
x = 0
y = 0
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)

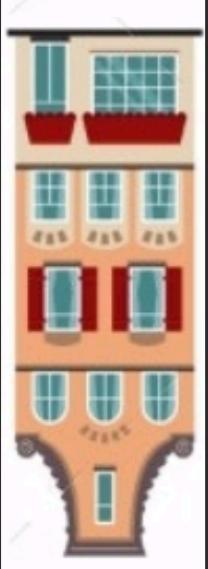
def change_color(rect):
    rect.fill_color = 'ma
```



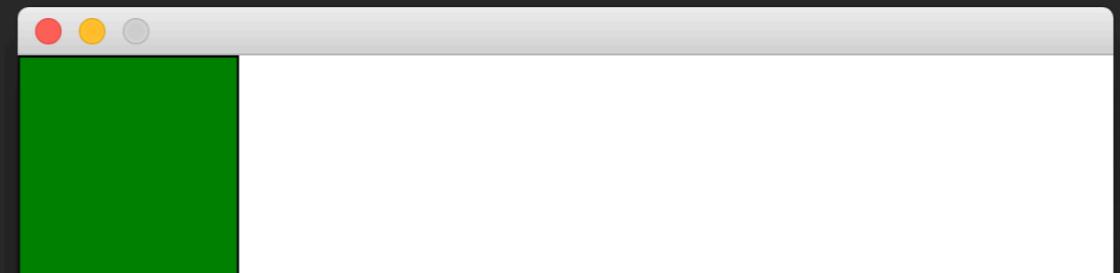
rect

GRect (100, 100)

0x100



width=100
height=100
x = 0
y = 0
filled=True
fill_color='green'



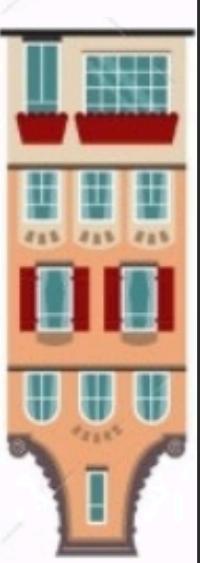
```
window = GWindow()

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
```

GRect (100, 100)

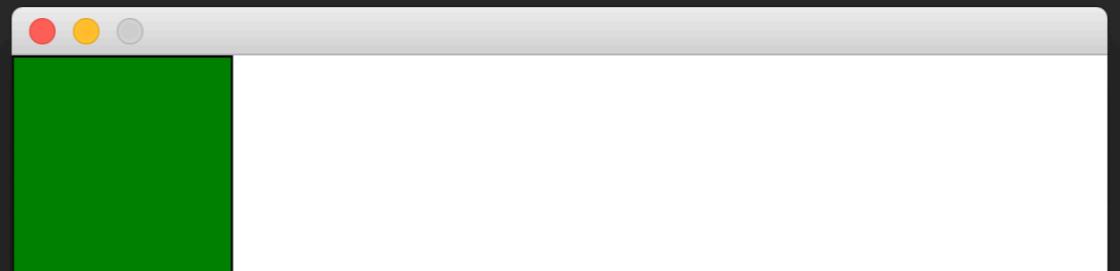
0x100



width=100
height=100
x = 0
y = 0
filled=True
fill_color='green'



rect

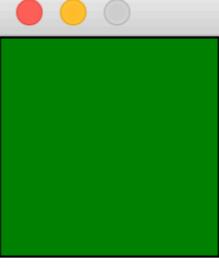


```
window = GWindow()

def main():

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

GRect (100, 100)
0x100



```
width=100
height=100
x = 0
y = 0
filled=True
fill_color='green'
```

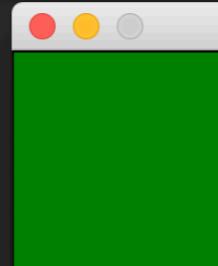
```
window = GWindow()  
  
def main():
```

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

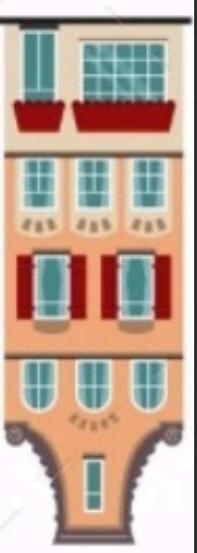
```
    rect.fill_color = 'magenta'
```

rect

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



0x100



width=100
height=100
x = 0
y = 0
filled=True
fill_color='green'

```
window = GWindow()  
  
def main():
```

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

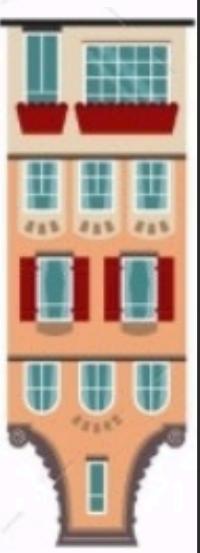
```
    rect.fill_color = 'magenta'
```

rect

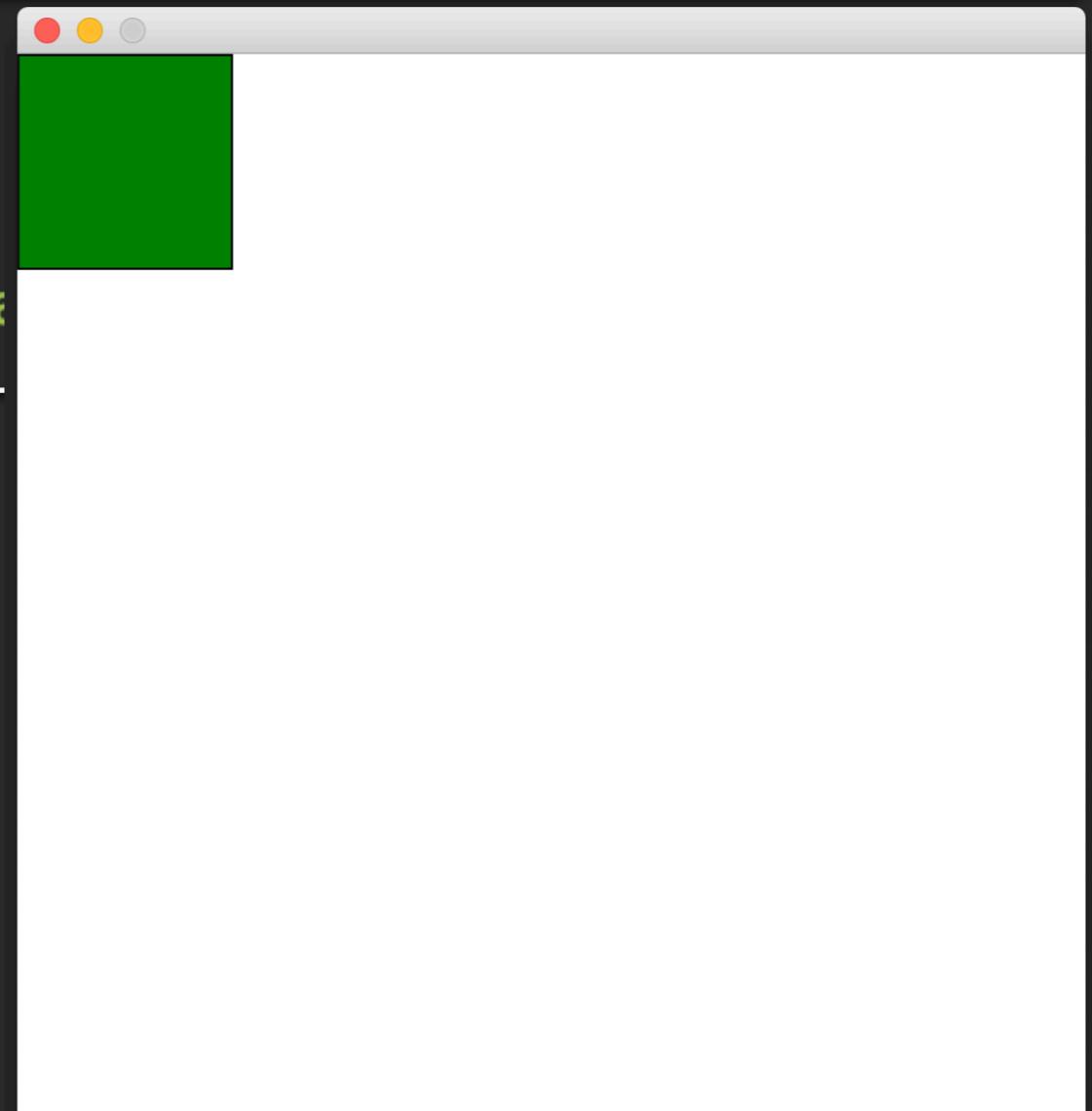
```
def change_color(rect):  
    rect.fill_color = 'ma
```

GRect (100, 100)

0x100



width=100
height=100
x = 0
y = 0
filled=True
fill_color='magenta'



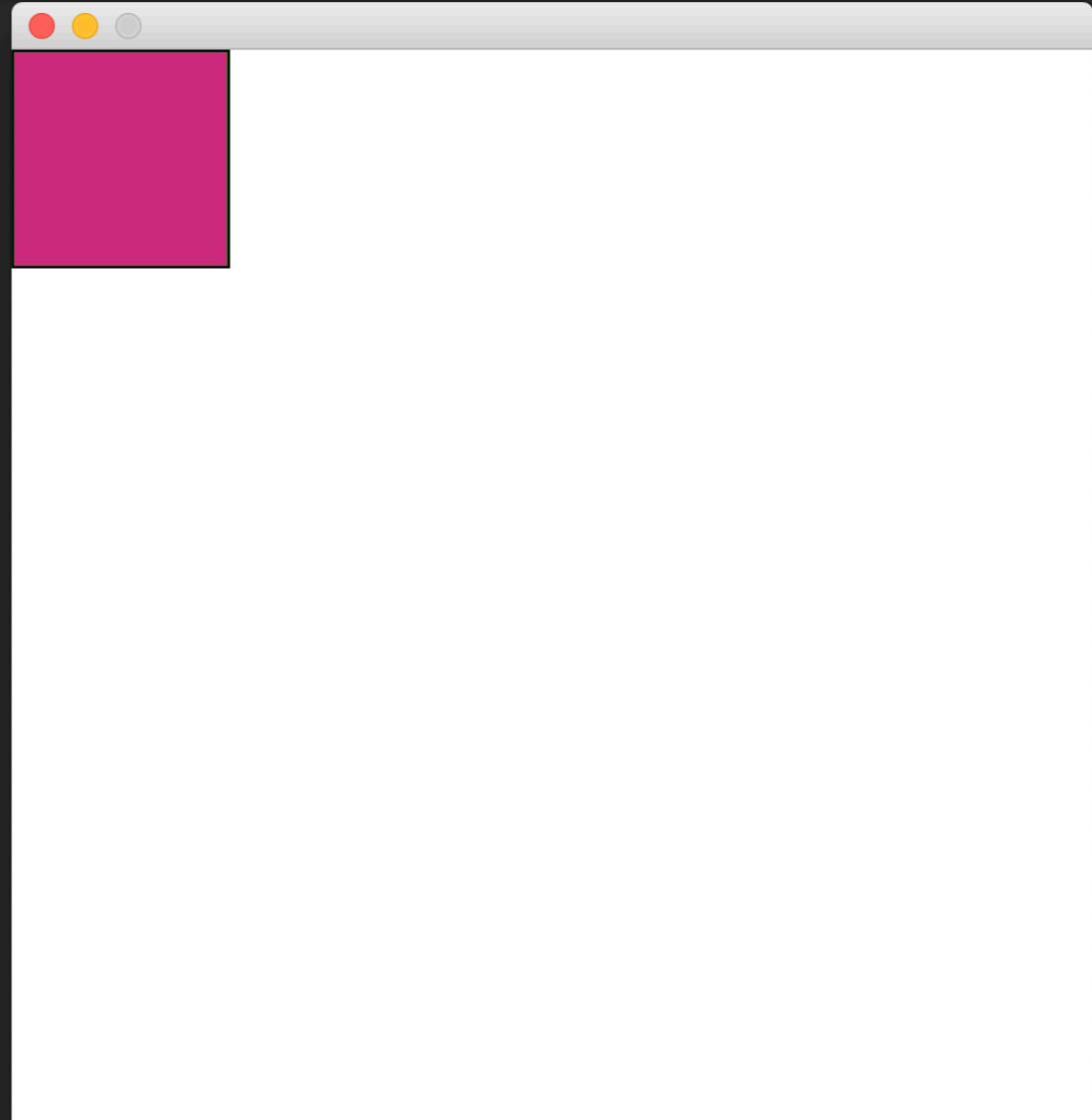
```
window = GWindow()  
  
def main():
```

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

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

rect

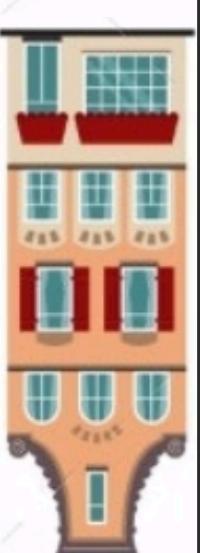
```
def change_color(rect):  
    rect.fill_color = 'ma
```



GRect (100, 100)

0x100

width=100
height=100
x = 0
y = 0
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
x = 0
y = 0
filled=True
fill_color='magenta'



0x10A 0xFFFF 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!')
```

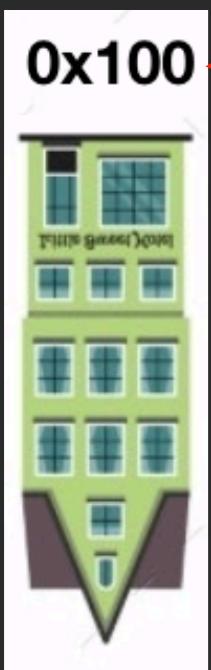
```
def main():
    rect1 = GRect(100, 100)
    rect2 = GRect(100, 100)
    if rect1 == rect2:
        print('They are the same!')
    else:
        print('They are different!')
```

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

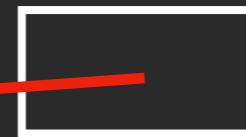
0x100



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

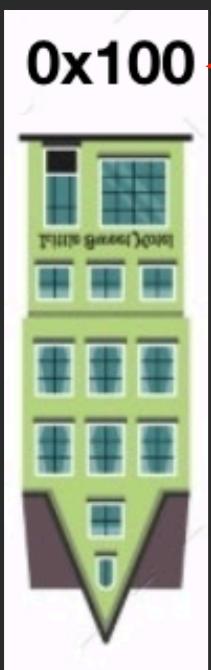


0x100



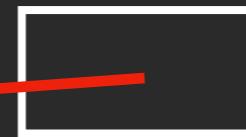
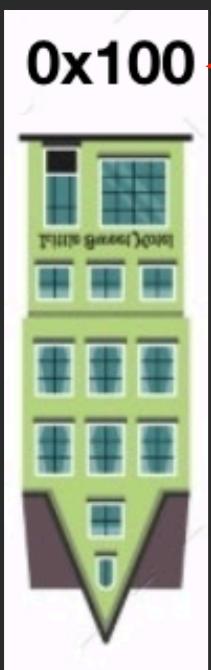
rect1

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

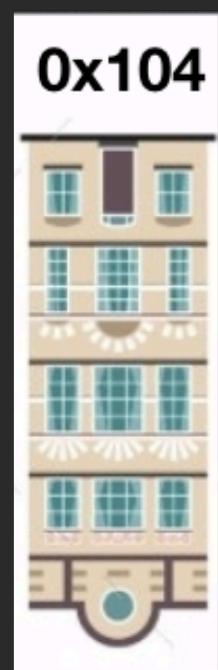


rect1

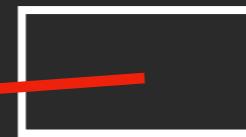
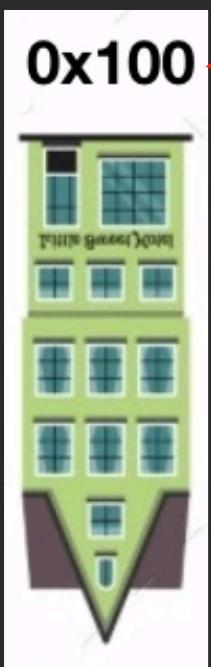
```
def main():
    rect1 = GRect(100, 100)
    rect2 = GRect(100, 100)
    if rect1 == rect2:
        print('They are the same!')
    else:
        print('They are different!')
```



rect1



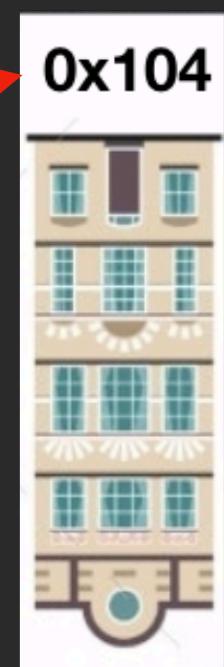
```
def main():
    rect1 = GRect(100, 100)
    rect2 = GRect(100, 100)
    if rect1 == rect2:
        print('They are the same!')
    else:
        print('They are different!')
```



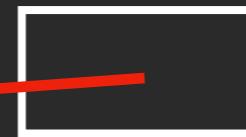
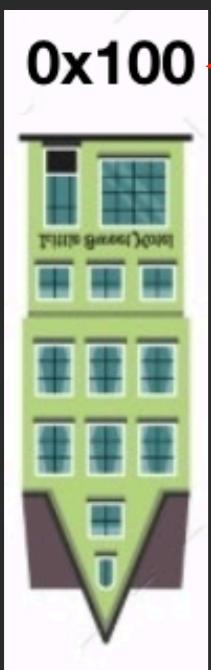
rect1



rect2



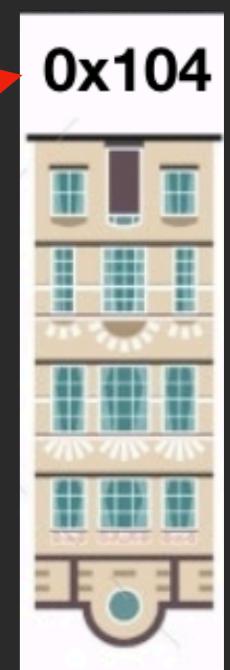
```
def main():
    rect1 = GRect(100, 100)
    rect2 = GRect(100, 100)
    if rect1 == rect2:
        print('They are the same!')
    else:
        print('They are different!')
```



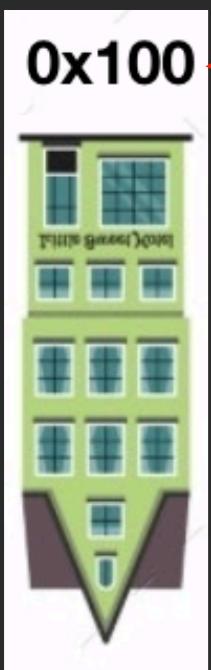
rect1



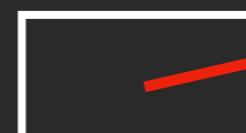
rect2



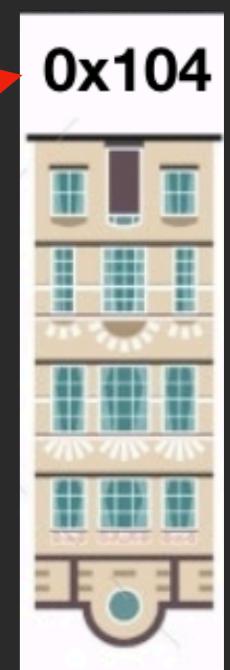
```
def main():
    rect1 = GRect(100, 100)
    rect2 = GRect(100, 100)
    if rect1 == rect2:
        print('They are the same!')
    else:
        print('They are different!')
```



rect1



rect2



0x104

```
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

Web Development

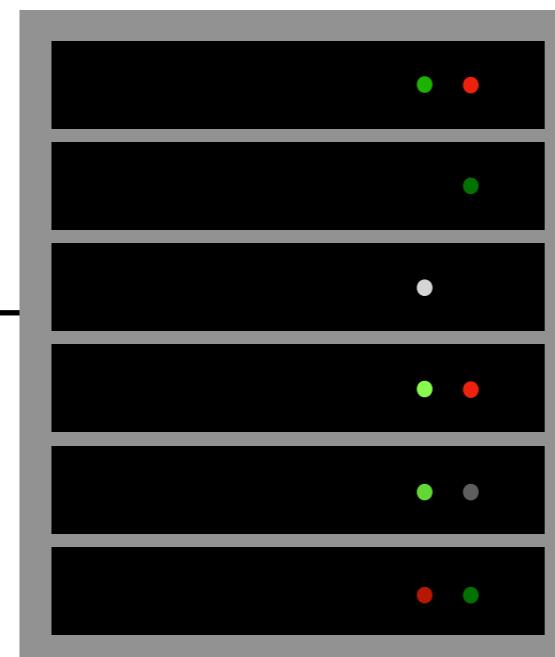
Web



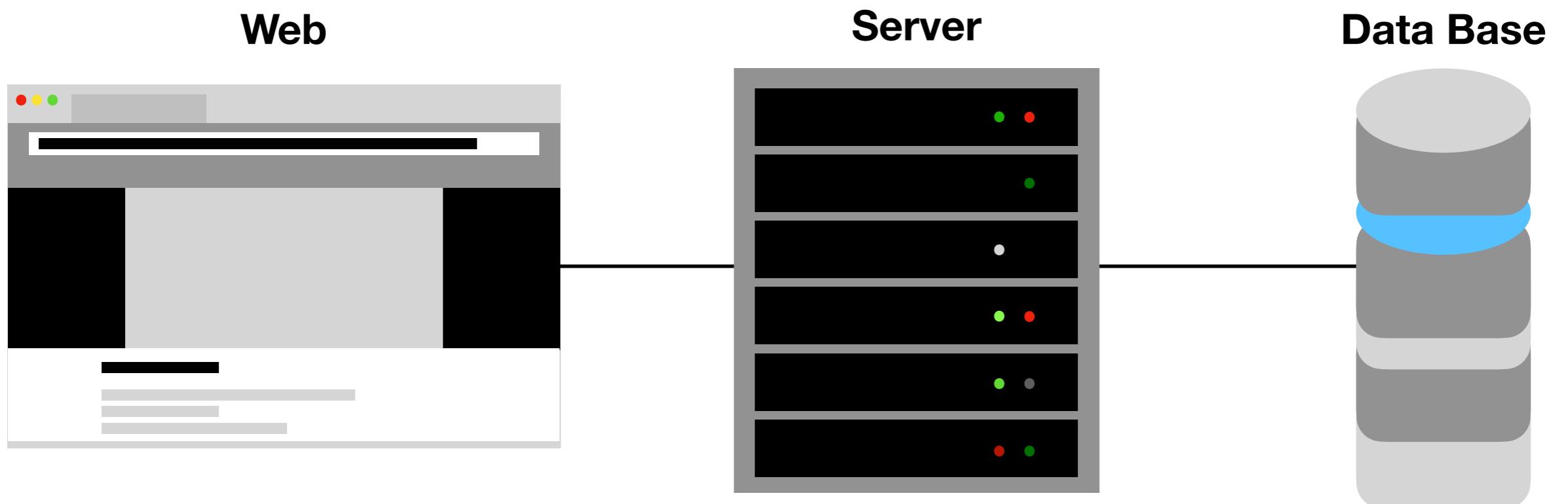
Web

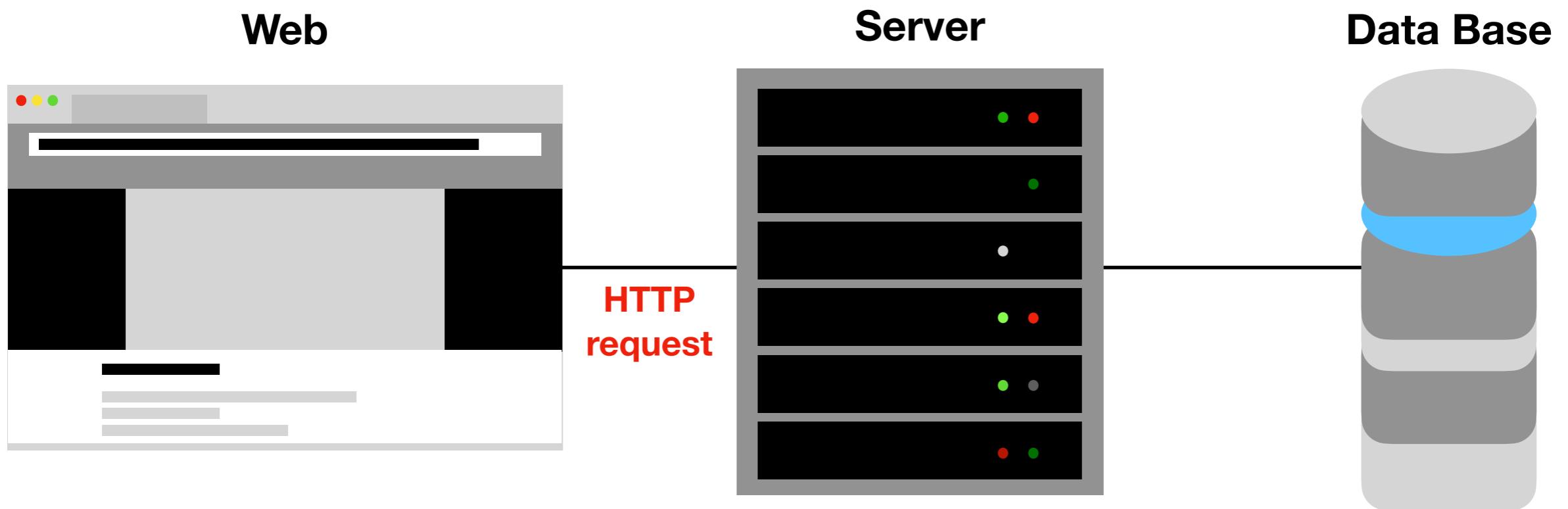


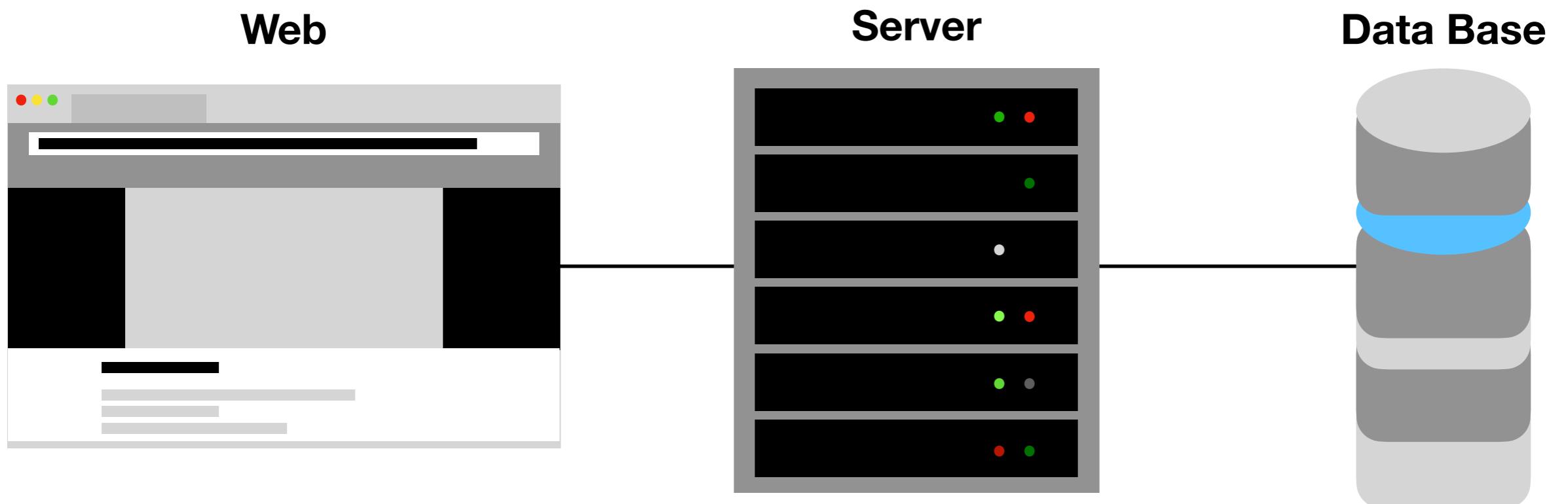
Server

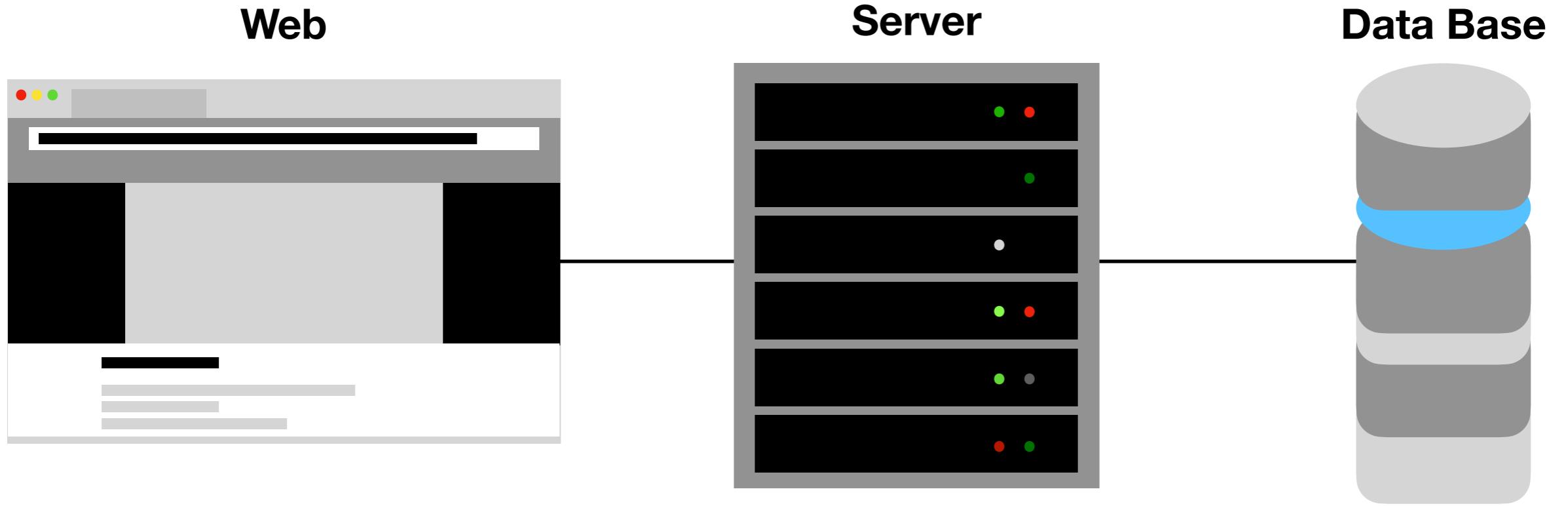












Front End Developer



Front End Developer

Back End Developer

HTML Only

 Computer Programmers
This topic is about the people who call themselves "Computer Programmers". This includes things like the culture of computer programming, social issues, technical issues, job i...
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 Al Klein wrote this · [Computer Programmers](#)
- 10h Founders
and
Which laptop do programmers use?

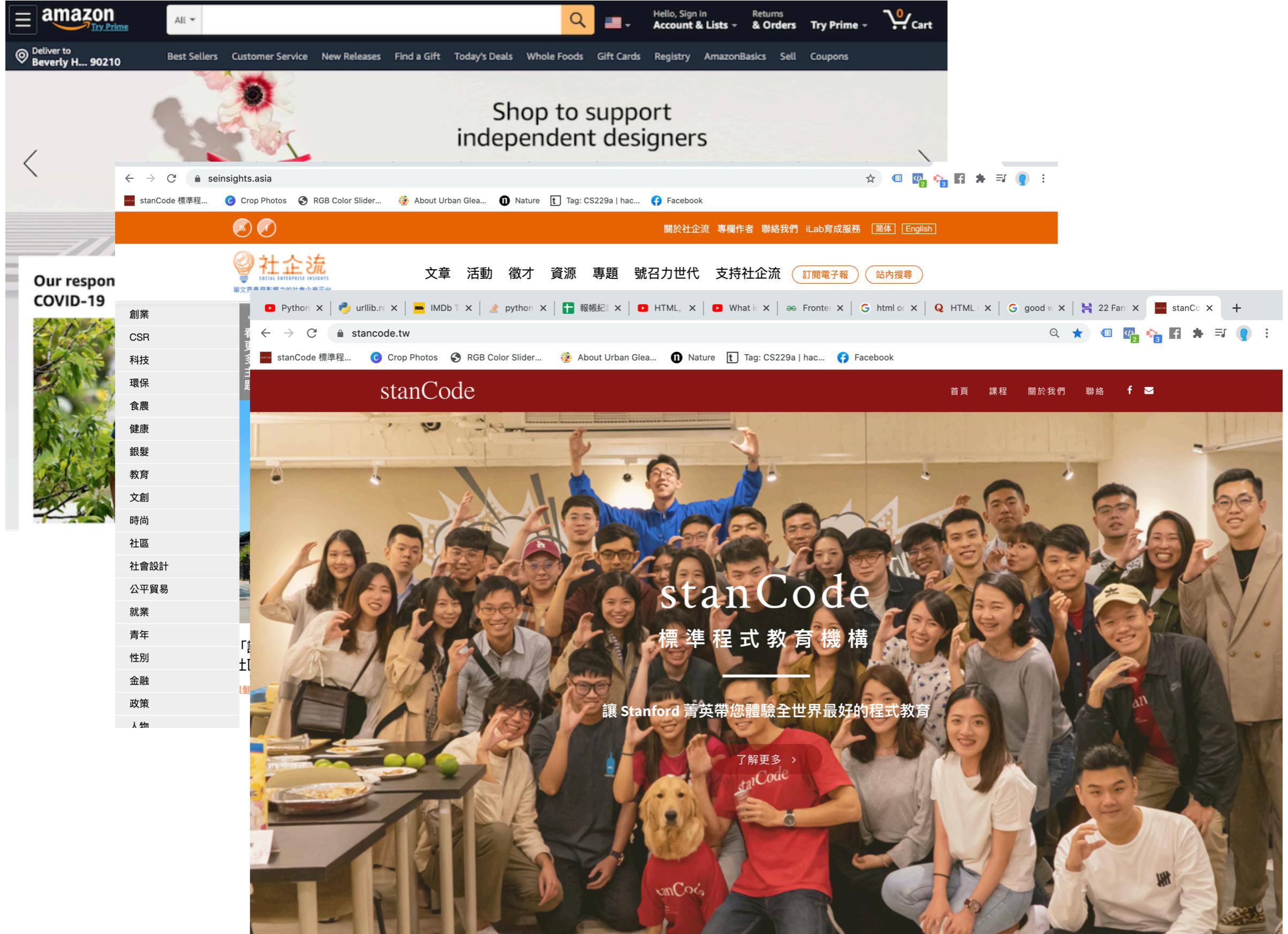
- Ok, how does it cost?
 [Learning to Program](#)
-  Education
Al Klein 43 years of earning a living developing systems.
[Written 3h ago](#)
-  [Web Design](#)
Real programmers? The one they prefer.
- How much does it cost? Anywhere between \$100 and \$1,500.
 [Mobile](#)
-  Applications
You don't buy extreme power to write HTML. You don't waste money to compile 5,000 lines of C++ or 50,000 lines of T-SQL.
- A real programmer doesn't choose by brand, size (or, in languages by commands or "pretty-ness"), but by fitting the tool to the job. Many programs can't be compiled on laptops (just try installing a few 25 million record database tables on a laptop), so they use desktops or minis.
 [React \(JS\)](#)
-  Library
It's like  which <insert tool name> any <insert trade> uses. Sure you can patch a tire with a small hole with hand-held tools, but the guy working on the tires of those huge earth-movers in Minnesota doesn't patch 6" holes in *those* tires with hand-tools.

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(statistics)
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To pick a minor net - 25million records, on a modern laptop, isn't all that much.



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IMDb

All

Search IMDb



Jerry



Elements

Console Sources

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Memory

App

IMDb Charts

Top Rated Movies

Top 250 as rated by IMDb Users

Showing 250 Titles

Sort by: Ranking

IMDb Rating	Your Rating
-------------	-------------

1. 刺激1995 (1994)

★ 9.2



2. 教父 (1972)

★ 9.1



3. 教父第二集 (1974)

★ 9.0



4. 黑暗騎士 (2008)

★ 9.0



5. 十二怒漢 (1957)

★ 8.9



6. 辛德勒的名單 (1993)

★ 8.9



7. 魔戒三部曲：王者再臨 (2003)

★ 8.9



8. 黑色追緝令 (1994)

★ 8.8



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ce5f3bba" data-userid="ur101827900" data-pagetype="chart" data-tp="">>
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```

```
<div class="article">
```

```
<h3>IMDb Charts</h3>
```

```
<div class="chart-social-sharing-widget" id="social-sharing">
```

```
<h1 class="header">Top Rated Movies</h1>
```

```
<div class="byline">Top 250 as rated by IMDb Users</div>
```

```
<hr>
```

```
<div class="lister">
```

```
<div>...</div>
```

```
<br class="clear">
```

```
<table class="chart full-width" data-caller-name="chart-t">
```

```
<colgroup>...</colgroup>
```

```
<thead>...</thead>
```

```
<tbody class="lister-list">
```

```
<tr>
```

```
<td class="posterColumn">...</td>
```

```
<td class="titleColumn">
```

```
"
```

```
1.
```

```
"
```

```


```

```
<span class="secondaryInfo">(1994)</span>
```

```
</td>
```

```
<td class="ratingColumn imdbRating">
```

```
<strong title="9.2 based on 2,315,883 user rating">
```

```
</strong>
```

```
<td class="ratingColumn">...</td>
```

```
<td class="watchlistColumn">...</td>
```

```
</tr>
```

```
<tr>
```

```
<td class="posterColumn">...</td>
```

```
<td class="titleColumn">
```

```
"
```

```
2.
```

```
"
```

```
... span.ab_widget div.seen-collection div.article div.lister table.chart.full-width tbody.lister
```

```
⋮ Console What's New ×
```

```
Highlights from the Chrome 87 update
```

New CSS Grid debugging tools

Debug and inspect CSS Grid with the new CSS Grid debugging tools.

New WebAuthn tab

Emulate authenticators and debug the Web Authentication API with the new WebAuthn tab.

Move tools between top and bottom panel

Move tools in DevTools between the top and bottom panel.

<Mac>

```
python3 -m pip install requests  
python3 -m pip install bs4
```

<Windows>

```
py -m pip install requests  
py -m pip install bs4
```

```
def main():
    d
    d
    a
    c
    c
    c
    c
    c
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    d
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    d
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    d
    d
    d
    d
    d
    d
    d
    def factorial(n):
        return n * factorial(n-1)
```

Stack Overflow

```
def main():
    d
    d
    d
    d
    def factorial(n):
        return n * factorial(n-1)
    0
```

Base Case

```
def factorial(n):
    if n == 0:
        return 1
    else:
        return n * factorial(n-1)
```

The diagram illustrates the recursive calls for calculating the factorial of 5. It shows six overlapping dark grey rectangles representing the call stack. Above each rectangle, a red number indicates the current value of *n*: 5, 4, 3, 2, 1, and 0. The code itself is a recursive function definition:

```
def factorial(n):
    if n == 0:
        return 1
    else:
        return n * factorial(n-1)
```

```
def factorial(n):
    if n == 0:
        return 1
    else: 1
        return n * factorial(n-1)
```

```
def factorial(n):  
    if n == 0:  
        return 1  
    else: 2  
        return n * factorial(n-1)  
1
```

```
def factorial(n):
    if n == 0:
        return 1
    else:
        return n * factorial(n-1)
```

5

4

3

2

2

```
def factorial(n):  
    if n == 0:  
        return 1  
    else:  
        return n * factorial(n-1)
```

6

```
def factorial(n):
    if n == 0:
        return 1
    else:
        return n * factorial(n-1)
```

24

```
def main():
    print(factorial(5))
```

120