

Vertical Difference

- In the house example, we had a program that could make houses of varying widths
- What about a program that can produce output of varying heights?

Smiles

- In this case, your program should take a number as input
- Make the face taller or shorter, based on the input value

The Goal: Face printing

What size face should be printed? 0

```
  ///|\\
 / 0  0 \
 |  I  |
 | \  / |
 |  _  |
 |  _  |
```

The Goal: Face printing

What size face should be printed? 1

```
  ///|\\
 / 0  0 \
 |      |
 |  I   |
 |      |
 |  \___/ |
 |  \___/
```

The Goal: Face printing

What size face should be printed? 3

```
  ///|\\
/  0  0  \
|          |
|          |
|          |
|    I    |
|          |
|          |
|          |
|  \____/  |
| \____/   |
```

Implement the face program!

- The space between the eyes and nose and nose and mouth changes with varying sized faces
- You can use other characters for the eyes, nose, hair

Face Printing Step 1

- Just get a face printing out
- Don't yet worry about adjusting the height

A face:

```
  ///|\\
 / 0  0 \
 |  I  |
 | \  / |
 |  _  |
 |  _  |
```

Face Printing Step 2

- Accept the input value and convert it to an int

What size face should be printed? 3

```
  ///|\\  
 / 0  0 \  
|   I   |  
|  \_/_/ |  
|  \_/_/ |  
|  \_/_/ |
```


Face Printing Step 3

- Make the size adjustable!

What size face should be printed? 3

What size face should be printed? 1

What size face should be printed? 0

```
height = int(input('input: '))
```

```
print(' ///|\\\\\\\\\\\\\\\\')
```

```
print('/ 0    0 \\\')
```

```
print('|          |\n' * height, end="")
```

```
print('|    I    |')
```

```
print('|          |\n' * height, end="")
```

```
print('|  \_\_\_ /  |')
```

```
print('|  \_\_\_\_\_ /')
```

Division in Python

- What does it print out?

```
age = 35  
half_age = age / 2  
print('You' * half_age)
```

Two numeric types: float and integer

- An **integer** is a type of value that can represent numbers without decimals or fractions
- A **float** can represent numbers with decimals

```
age = 35                # integer
score = 81.23           # float
height_meters = 1.8288  # float (6 feet)
print(type(age))
print(type(score))
print(type(height_meters))
```

Division in Python

- You can complete a **division** operation with the forward-slash (/)
- For example

```
age = 35
```

```
half_age = age / 2
```

Division in Python

- What does it print out?

```
a = 52 / 7
e = 27 / 5
c = int(a)
print(e, '#' * c, c)
print('#' * c, e)
print(e, a, e)
```

5.4 ##### 7

5.4

5.4 7.428571428571429 5.4

Flag

- Write a program that takes one value as input
- This value will be used to determine the width of a flag

Enter flag size: 10

```
#####-----  
#####-----  
-----  
-----
```

Enter flag size: 20

```
#####-----  
#####-----  
-----  
-----
```

Enter flag size: 30

```
#####-----  
#####-----  
-----  
-----
```


flag

```
width = int(input('Enter flag size: '))
```

```
half_width = int(width / 2)
```

```
print()
```

```
print('#' * half_width + '-' * half_width)
```

```
print('#' * half_width + '-' * half_width)
```

```
print('-' * width)
```

```
print('-' * width)
```

Flag (version B)

- Write a program that takes **TWO** values as input
- This value will be used to determine the width **and height** of a flag

Enter flag width: 10
Enter flag height: 4

```
#####-----  
#####-----  
-----  
-----
```

Enter flag width: 20
Enter flag height: 6

```
#####-----  
#####-----  
#####-----  
-----  
-----  
-----
```

Enter flag width: 30
Enter flag height: 8

```
#####-----  
#####-----  
#####-----  
#####-----  
#####-----  
-----  
-----  
-----  
-----  
-----
```

Flag (version B)

```
width = int(input('Enter flag width: '))
height = int(input('Enter flag height: '))
half_width = int(width / 2)
half_height = int(height / 2)

print()
upper_row = '#' * half_width + '-' * half_width + '\n'
lower_row = '-' * width + '\n'
print(upper_row * half_height, end='')
print(lower_row * half_height)
```