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

```
What size face should be printed? 1
 ///|\\\
/ 0   0 \
|       |
|   I   |
|       |
| \___/ |
 \_____/
```

```
What size face should be printed? 0
 ///|\\\
/ 0   0 \
|   I   |
| \___/ |
 \_____/
```

```
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)
```