

Decisions and Repetition



CHAPTER 3

A few new constants



- Constants so far:
 - Strings
 - Numbers
 - ✦ integer
 - ✦ float
- Boolean constants: [On board]

A few new operators



- All of these are binary operators and create a Boolean result.

- We'll use them as **conditions**.

==

!=

<

>

<=

>=

not

and

or

Decisions (if statement)



- Our programs so far...**linear**

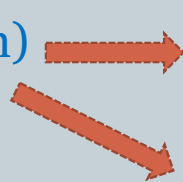
- Real programs need to make decisions:

- Return to title screen **if** player's health at 0.
- Turn off the speed-boost **if** player has had it for 5 seconds
- Increase the player's ammo **if** they have less than 100 **otherwise** store in backpack.

Decision (based on a condition)

Action to take if the condition is true

Action to take if the condition isn't true



If statements in python



- Type I (optionally do something)

```
if cond:  
    # Block of code
```

- Type II (do one of two things)

```
if cond:  
    # Block of code  
else:  
    # Block of code
```

If statements, cont.



- Type III (do one of n things)

```
if cond1:  
    # Block of code  
elif cond2:  
    # Block of code  
elif cond3:  
    # Block of code  
else:  
    # Block of code
```

- Type IV (do 0 or 1 of n things)

- Like Type III but no else.

Examples



- **Time-guesser**
 - Computer waits for 5-10 seconds.
 - Try to guess the # of seconds (within 0.1)
 - Computer tells you “correct”, “too low”, or “too high”

Repetition



- Used to repeat a section of code 0-n times.
 - Keep moving the player until health == 0
 - Generate 10 numbers between 1 and 18 (stats)
 - Draw 500 stars in the background.

- **Syntax:**

```
while cond:  
    # While-block
```

- Evaluation of a while.

- [Mini-lab]

- write a loop which will print all positive powers of 2 which are less than x (initially x is 5000)
- FizzBuzz

Repetition, cont.



- break and continue
- Infinite Loops

Nested if & while



- An if-block and a while-block can contain any python code.
 - This includes other if & while statements.
- Examples:
 - Day-of-the-week + coin-flip "game" (if with nested-if)
 - Prompting the user for a valid login. (while with nested if)
 - Drawing a pygame starfield (while)
 - Animating a bouncing circle (while)
 - Drawing circles-within-circles(nested while)