

## Objectives

- Intro to conditional statements
- Broader Issue: Internet → Politics → (repeat)

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## Review: Animation

- What do we do to make graphics objects animate?
- Combination of
  - OO programming (graphics)
    - movement
  - Import a module with useful functions (time's sleep function)
  - Repetition (for loop)
    - Within a for loop!

circleShiftAnim.py

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## Parts of an Algorithm

- Input, Output
- Primitive operations
  - What data you have, what you can do to the data
- Naming
  - Identify things we're using
- Sequence of operations
- Conditionals
- Handle special cases
- Repetition/Loops
- Subroutines
  - Call, reuse similar techniques



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## Making Decisions

- Sometimes, we do things only if some condition holds (i.e., "is true")
- Examples
  - If the PB is new (has a safety seal)
    - Then, I will take off the safety seal
  - If it is raining and it is cold
    - Then, I will wear a raincoat
  - If it is Saturday or it is Sunday
    - Then, I will wake up at 9 a.m.
    - Otherwise, I wake up at 7 a.m.
  - If the shirt is purple or the shirt is on sale and blue
    - Then, I will buy the shirt

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## Conditionals

- Sometimes, we only want to execute a statement in certain cases
  - Example: Finding the absolute value of a number
    - $|4| = 4$
    - $|-10| = 10$
  - To get the answer, we multiply the number by -1 only if it's a negative number
  - Code:

```
if x < 0 :  
    abs = x*-1
```

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## Typical Execution

```
fahr = eval(input("..."))  
celsius = 5/9*(fahr-32)  
print("celsius=", celsius)
```

So far, we've thought of programs as a sequence of statements. Statements execute in order.

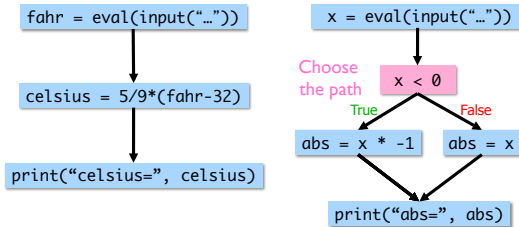
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## if Statements

- Change the **control flow** of the program



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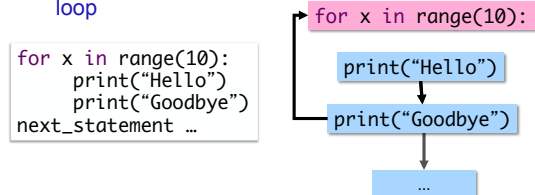
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## Other Constructs That Change Control Flow

- for** loops

Repeats a loop body a fixed number of times before going to the next statement after the **for** loop



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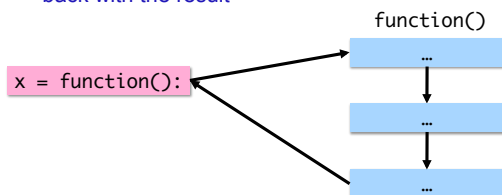
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## Other Constructs That Change Control Flow

- Function calls

Go execute some other code and then come back with the result



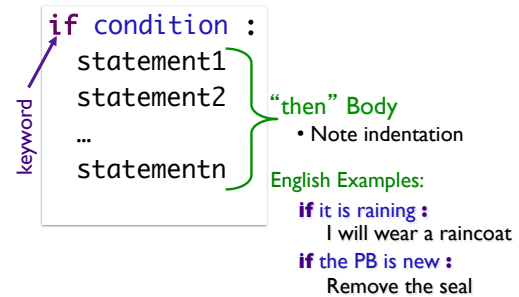
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## Syntax of if statement:

### Simple Decision



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## Conditions

- Syntax:
  - <expr> <relational\_operator> <expr>
- Evaluates to either True or False
  - Boolean type

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## Relational Operators

- Syntax:
  - <expr> <relational\_operator> <expr>

Relational Operator	Meaning
<	Less than?
<=	Less than or equal to?
>	Greater than?
>=	Greater than or equal to?
==	Equals?
!=	Not equals?

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Use Python interpreter

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## Examples: Using Conditionals

- Determine if a number is even or odd

```
x = eval(input("Enter a number: "))
remainder = x%2
if remainder == 0 :
    print(x, "is even")
if remainder == 1:
    print(x, "is odd")
```

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evenorodd.py 13

## Common Mistake: Assignment Operator vs. Equality Operator

- Assignment operator: =
- Equality operator: ==

```
x = eval(input("Enter a number: "))
remainder = x%2
if remainder = 0 :
    print(x, "is even.")
```

*Syntax error* (pointing to the assignment operator in the if statement)

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## Syntax of if statement: Two-Way Decision

English Example:

**if condition :** *if it is Saturday or Sunday :*  
     statement1 *I wake up at 9 a.m.*  
     statement2 *else :*  
     ... *I wake up at 7 a.m.*  
     statementn  
**else :**  
     statement1  
     statement2  
     ...  
     statementn

*“then” Body*  
*“else” Body*

*keywords* (pointing to if and else)

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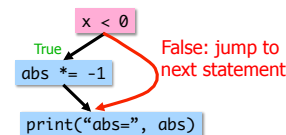
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## If-Else statements (absolute values)

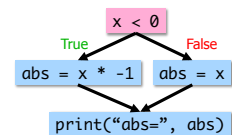
```
abs=x
if x < 0 :
    abs *= -1
print("abs=", abs)
```

```
if x < 0 :
    abs = x * -1
else :
    abs = x
print("abs=", abs)
```

If statement



If-else statement



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## Examples: Using Conditionals

- Determine if a number is even or odd
- More efficient implementation
  - Don't need to check if remainder is 1 because if it's not 0, it *must* be 1

```
x = eval(input("Enter a number: "))
remainder = x % 2
if remainder == 0:
    print(x, "is even")
else:
    print(x, "is odd")
```

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## Practice: Draw the Flow Chart

```
print("This program determines your birth year")
print("given your age and current year")
print()
age = eval(input("Enter your age: "))
if age > 120:
    print("Don't be ridiculous, you can't be that old.")
else:
    currentYear = eval(input("Enter the current year: "))
    birthyear = currentYear - age
    print()
    print("You were either born in", birthyear, end='')
    print("or", birthyear-1)
    print("Thank you. Come again.")
```

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## Practice: Speeding Ticket Fines

- Any speed clocked over the limit results in a fine of at least \$50, plus \$5 for each mph over the limit, plus a penalty of \$200 for any speed over 90mph.
- Our program
  - Input: speed limit and the clocked speed
  - Output: either (a) that the clocked speed was under the limit or (b) the appropriate fine

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## Extra Credit Opportunity

- Monday, 11:15 a.m.
- Andy Danner, Swarthmore College
  - GIS/CS
- Post to Sakai forum
  - A one-sentence overview of the talk
  - 3 most important points
  - Most surprising thing he mentioned
  - One question you wondered during the talk

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## Broad Issue

- Politics → Internet; Repeat

Jonathan  
Colby  
Kari  
Haley

Shannon  
Sam  
Lijiang  
John K  
Josh

Cory  
Deirdre  
Will  
Trang  
John G

Koven  
Mary  
Emily  
Phil  
Drew

Luke  
Gaurav  
Connor  
Gabi  
Hang

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## Discussion

- Did Google do the right thing with the Santorum results?
- How do you think Google's ranking algorithm works?
- What did SOPA and PIPA propose to do?
  - Was that a good goal/approach? If not, how would you improve it?
- What are connections between the articles?
- How much power does Google have?
- How much power does Wikipedia have?

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## Discussion

- What is Google's motto?
- Would you use a politically biased search engine? Is there a market for a politically biased search engine?
  - A differently biased search engine?

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## Relation to Class

- "Despite Google co-founder Sergey Brin being Jewish and himself disgusted with the result, it stood. Intervention, when Google's ranking **algorithms** had spoken, was seen as harmful to user trust," Sullivan writes.

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