

Lecture 3: While Loops

CS 51P

September 12, 2022

Review: Conditional Statements

- conditional statement syntax conditions

```
x = int(input("what's your favorite positive int?"))
if x == 13:
    print("that's my favorite number too!")
elif x > 13:
    print("my favorite number is less than that.")
else:
    print("my favorite number is more than that.")
```

- condition must be an expression that evaluates to True or False (type bool)
 - Booleans: True, False
 - relational operators: ==, !=, >, <, >=, <=
 - logical operators: and, or, not
 - functions that evaluate to type bool

What about...

```
what's your favorite positive int?  
    absdfa  
that's not a positive int!
```

```
x = input("what's your favorite " +  
          "positive int?")  
if not str.isdigit(x):  
    print("That's not a positive int!")
```

- The condition can be any expression that evaluates to True or False (type bool)
 - Boolean values (e.g., True), expressions with relational operators (e.g., $x < 5$), expressions with logical operators (e.g., True or False), or functions that return a Boolean value

What about...

- What if we wanted a program that asks the user for a positive number and keeps asking until the user enters a positive int, then prints "Thanks!"
- Example run

```
what's your favorite positive int?  
-10  
That's not a positive int! Try again:  
hello  
That's not a positive int! Try again:  
13  
Thanks!
```

while loops

- When you want some set of statements to execute repeatedly . . . until some stopping criteria is met.

`while <boolean expression>:`



Code

True
`x < 5`
`(x < 0) or (x > 1000000)`
`not(str.isdigit(x))`

whitespace
matters

Example 1

- Write a program that asks the user for a positive number and keeps asking until the user enters a positive int, then prints "Thanks!"
- Example run

```
Enter a positive integer:
```

```
-10
```

```
That's not a positive integer! Try again:
```

```
hello
```

```
That's not a positive integer! Try again:
```

```
13
```

```
Thanks!
```

Exercise

Write a program that prompts user for a password, repeating until the correct password is entered, then prints "got it!"

Assume that the correct password is "123456"

Example

Write a program that asks the user for a positive integer and then counts down from that value to 1 (all on one line!) and then prints "GO!" on the next line. For example, if the user enters 5, it should print:

```
5, 4, 3, 2, 1  
GO!
```


Exercise

Write a program that asks the user for a positive integer and then prints the value $1^2 + 2^2 + \dots + n^2$

Exercise

Write a program that asks the user for a positive integer and then prints the sum of the odd values between 1 and n.

For example, if the user enters 5, it would print 9 (since $1 + 3 + 5 == 9$)