ECS15

while
Overview

- Keep going
- Use a **while** loop.
- **while** Boolean:

  Do statements in block

- **while** loop **iterates** through block
Flows

**Sequential**

Block of instructions 1

Block of instructions 2

Block of instructions 3

**Conditional**

Condition

True

instructions 1

False

instructions 2

**Repeating**

For each item

Block of instructions
While loop example

```python
count = 0
while count < 10:
    count = count + 1
print count
```
While loop example

- How to use while loop to detect correct inputs?
While loop example

```python
choosing = True
while choosing:
    answer = raw_input("Choose h or t: ")
    if answer == "h" or answer == "t":
        choosing = False
```

While loop example
How to keep playing until the user decides to quit?
- Valid inputs: “r”, “p”, “s”, or “q”

Boolean variable **picking**
- True while we still need to pick r, p, s
  - A bad input or a good input that is not “q”
- Set it to False when the user decides to quit
- Handles BOTH bad inputs and a regular game
- See rsp2.py
Infinite loop

- One of the classic programming bugs
- Get out of it using CRTL-c (hold down control key and type c)
- Repeat after me: CRTL-c
Compound interest

- Say you invest $100 and make 7% annually
- After one year you have:
  $100 + \frac{100 \times 7}{100} = 107$
  You made $7.00
- If you leave it invested, and make another 7% the next year, you have:
  $107 + \frac{107 \times 7}{100} = 114.48$
  You made $7.49
Compound interest

- The more you have the more you make

![Graph showing the growth of $100 at 7% annual interest over 50 years](image)
“Compounded monthly”

- Instead of computing and adding interest every year, do it every month.
- Use interest rate of \((\frac{7}{12})\% = 0.583\%\)
- Because you add a little to the balance each month, you make a bit more when compounded monthly than when compounded annually.
- This is called the Effective Interest Rate
Compute Effective Interest Rate

- Write a program to calculate it.
- Use a while loop to iterate through 12 months
- What about when the principal is not $100?
- $EIR = \text{(balance-principal)} \times \frac{100}{\text{principal}}$
- Read eir.py
Interest on a debt

- When you are paying interest, compound interest is a bad thing!
- Credit cards compound monthly, so if your rate is 15%, you really are paying...
Compound interest program

- Original debt is $10,000
- Every month, make a payment and pay interest
- Loop until debt is paid off
Similar to calculators on Web

What will it take to pay off my balance?

Inputs

<table>
<thead>
<tr>
<th>Amount you owe</th>
<th>$10,000</th>
</tr>
</thead>
<tbody>
<tr>
<td>Future monthly charges</td>
<td>$0</td>
</tr>
<tr>
<td>Future monthly payments</td>
<td>$350</td>
</tr>
<tr>
<td>Interest rate</td>
<td>12.00%</td>
</tr>
<tr>
<td>Annual fee</td>
<td>$0</td>
</tr>
<tr>
<td>Desired months to pay off</td>
<td>12</td>
</tr>
</tbody>
</table>

Predicted rate change

- None
- An increase of 1.00% per year
- A decrease of 1.00% per year

Debt Management Tools

- Get Out of Debt Planner
- Impact of Interest Rate
- Lower Rate Worth Fee?
- Consolidate My Debt?
- Consolidate My Cards?
- What Will It Take to Pay Off My Balance?
- See All Calculators

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