Concept Review:
Basic Programming Mechanics

- Computer overview and how we got here.
  - What’s binary? How do we convert binary to decimal?
  - What’s ASCII? How do we use that?

- Functions
  - How to call a function
  - Arguments
  - Return Values

- Commenting your code

- Variables
  - Creating variables
  - Using variables in expressions
  - Naming rules

- Reading input from the keyboard with the input() function
Concept Review: Math Expressions

- Math operators (+, -, /, //, *)
- Writing math expressions
- Evaluating math expressions
- Storing & printing the results of math expressions
- Difference between the two division operators (/ and //)
- Order of operations in math expressions
- The exponent operator (**)
- The modulo operator (%)
Concept Review: Data Types

- Strings
- Numeric data types
  - Integers (int)
  - Floating point numbers (float)
- Mixed type expressions
- Data type conversion
  - Using the float() and int() function to convert strings into numbers
  - User input & data types (converting strings to floats / ints for calculation purposes)
- The Boolean data type
- Boolean variables
Concept Review: Output with the print() function

- General use of the print function and its default behavior
  - Unlimited arguments
  - Spaces inserted between arguments
  - Line break after each call to the function
- Customizing line endings (end="")
- Customizing argument separators (sep="")
- Escape characters (\n, \t, etc.)
Concept Review:
Basic String Manipulation

- Combining two strings (concatenation) – "+" operator
- Multiplying a string (repetition) – "*" operator
- Formatting numbers using the format() function
  - Formatting Strings – width, left align, right align
  - Formatting Integers – width, left align, right align
  - Formatting Floats – width, left align, right align, # of decimal places, "," separator
- Case manipulation using str.lower() and str.upper()
- Calculating string length using the len() function
Concept Review: Selection Statements

- The structure of an IF statement (IF keyword, condition, colon, indentation)
- Writing a condition for an IF statement
- Boolean operators (<, >, ==, !=, >=, <=)
- Comparing numeric values using Boolean expressions
- Comparing string values using Boolean expressions
- Using the IF-ELSE statement
- Nesting decision structures (IF statements inside other IF statements)
- The IF-ELIF-ELSE statement
- Logical operators (and, or, not)
Concept Review: Condition Controlled Loops

- The structure of a "while" loop
- Mechanics & how they work
- Setting up conditions for a while loop
- Infinite loops and how to work with them
- Sentinels (defining a value that the user enters that causes the loop to end)
- Input validation loops (asking the user to continually enter a value until that value matches some condition)
- Setting up and using accumulator variables
- Self referential assignment statements (i.e. counter = counter + 1)
- Augmented assignment operators (i.e. counter += 1)
Concept Review: Miscellaneous Concepts

- Generating random numbers
- Errors & error types
- Debugging strategies
- Order of evaluation

<table>
<thead>
<tr>
<th>Order of Operations</th>
<th>Operator(s)</th>
<th>Operator Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Done 1st</td>
<td>()</td>
<td>specify order of operations</td>
</tr>
<tr>
<td>2nd</td>
<td>**</td>
<td>exponentiation</td>
</tr>
<tr>
<td>3rd</td>
<td>*, /, //, %</td>
<td>multiplicative</td>
</tr>
<tr>
<td>4th</td>
<td>+, -</td>
<td>addition</td>
</tr>
<tr>
<td>5th</td>
<td>==, !=, &lt;=, &gt;=, &lt;, &gt;</td>
<td>comparison</td>
</tr>
<tr>
<td>6th</td>
<td>not</td>
<td>logical</td>
</tr>
<tr>
<td>7th</td>
<td>and</td>
<td>logical</td>
</tr>
<tr>
<td>Done last</td>
<td>or</td>
<td>logical</td>
</tr>
</tbody>
</table>
Midterm Format

- Output and short-answer questions (36 points)
  - Evaluate expressions
    - Math Operators
    - Boolean expressions
    - Logical operators
  - Execute a program or excerpt from a program and predict its output
  - Debug / re-write a non-functional program

- Programming questions (18 points)
  - Write a program from scratch
Studying order of operations

1. Do the practice paper test
2. Do at least some, if not all of the practice problems I posted online
3. Review the weekly slides
4. Review the modules
5. Review the assignments
Paper test