# Week one

Help Center

Functions — Functions

- Functions are reusable pieces of programs that take an input and produce an output.
- A function definition is a compound statement consisting of a header and a body.
- The header includes the keyword `def`, a sequence of parameters enclosed by parentheses, followed by a colon `:`.
- The body consists of a sequence of statements, all indented by 4 spaces.
- Functions may return a value using the keyword `return` or have a side effect (e.g., `print`).
- To evaluate a function call, replace the function's parameters in the body of the function by their associated values in the call and execute the body of the function.
- Lecture examples - Functions
- More examples - Stucture of Functions, Uses of Functions, Scope of Variables, Examples of Functions

Indentation — Functions

- Indentation consists of whitespace formed by blanks, tabs, and newlines.
- Leading white space indicates indentation level (4 spaces per level) and specifies logical grouping of statements in Python.
- Incorrect indentation can lead to errors.
- Lecture examples - Functions
- More examples - Function Errors

Remainders and modular arithmetic — More Operations

- Standard long division yields a quotient and a remainder. The integer division operator `//` computes the quotient. The operator `%` computes the remainder.
- For any integers `a` and `b`, `a == b * (a // b) + (a % b)`.
- In Python, `a % b` always returns an answer that is between `0` and `b` (even if `a` and/or `b` is negative).
- Remainders and modular arithmetic are very useful in games for the purpose of "wrapping" the canvas, i.e; causing objects that pass off of one side of the canvas to reappear on the opposite side of the canvas.
- Lecture examples - More operations
- More examples - Modulus, Math Module,

Modules — More Operations

- Modules are libraries of Python code that implement useful operations not included in basic Python.
- Modules can be accessed via the `import` statement.
- CodeSkulptor implements parts of the standard Python modules `math` and `random`.
- Lecture examples - More operations
- More examples - Math Module, Numbers and Strings, Random Module, Module Errors

Boolean Expressions — Logic and Comparisons

- The constants `True` and `False` of the type `bool`.
- These constants can be combined to form Boolean expressions via the logical operators `and`, `or`, and `not`.
- The `and` of two Boolean expressions is `True` if both of the expressions are `True`.

- The `or` of two Boolean expressions is `True` if at least one of the expressions is `True`.
- Lecture examples - None
- More examples - Booleans, Boolean Logic

Relational Operators — Logic and Comparisons

- The values of two arithmetic expressions can be compared using the operators `==`, `!=`, `<`, `>`, `<=`, `>=`.
- These comparisons return either `True` or `False`.
- Lecture examples - None
- More examples - Comparison, Boolean Expressions

Conditional Statements — Conditionals

- Conditional statements are compound statements consisting one or more clauses headed by the keywords `if`, `elif`, and `else`.
- Each `if` or `elif` clause is followed by a Boolean expression and a colon `:`.
- If the Boolean expression for a clause is `True`, the body of the clause is executed.
- Lecture examples - Conditionals
- More examples - if-elif-else, Examples of Conditionals

Programming Tips — Week 1

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