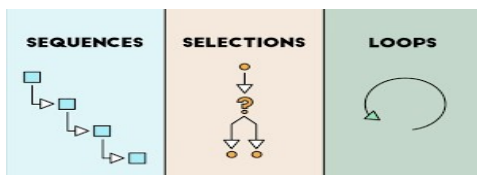


Unit 2—Python Programming 1...

HCCS STEM—Computer Science, IT, Engineering, Food/Nutrition, Business Studies

What do I need to be able to do?

1. I can understand core programming concepts like sequence and syntax, and use basic Python commands for output and input
2. I can declare variables, differentiate between various data types, perform arithmetic and comparison operations, and use conditional statements (IF, ELIF, ELSE) to enable decision-making in Python programs
3. I can implement iteration using both FOR and WHILE loops to repeat actions, and combine these loops with conditional statements to solve complex programming challenges effectively



Keywords

Sequence: A sequence is when instructions are followed one after another, in the exact order they are written, from top to bottom

Variable: A variable is a container that holds data or values which can change as the program is running

String: A string is a data type used to store text in Python

Integer: An integer is a data type that represents a whole number

Selection: Selection, also known as conditional statements, allows programs to make decisions and execute specific code blocks based on a condition

Iteration: Iteration is when you loop a set of program code to repeat actions, either for a definite or indefinite number of times

FOR Loop: A FOR loop is used for definite iteration, repeating a block of code for a known number of times, often using the range() command

WHILE Loop: A WHILE loop is used for indefinite iteration, repeating a loop endlessly until a specific condition is met, and often involves a counter variable

In programming, selection and iteration are two fundamental ways to control how a program runs.

Selection is like making a decision: your code checks a **condition** (like "is this true?") and then chooses which block of instructions to execute based on the outcome, using statements like IF, ELIF, and ELSE.

Only certain code blocks will run based on that decision. In contrast, **iteration** is about repeating actions.

A **FOR loop** is used for **definite iteration**, meaning it repeats a set of instructions a specific, known number of times (like counting down from 5), while a **WHILE loop** is for **indefinite iteration**, repeating a set of instructions continuously until a particular condition is met, such as asking for a password until the correct one is entered.

Imagine Python programming is like teaching a super-smart robot (your computer) exactly what to do, step-by-step, to solve problems or create cool things! With Python, you can tell the robot to build video games, make websites, help scientists discover new things, or even control other robots. It's important because it gives you the power to invent and make your ideas come to life in the digital world, like a superpower for your brain!

In Python programming, **variables** are essentially containers that hold data or values which can change as your program runs. Python needs to know what type of data is being stored in these containers. For instance, a **string** data type is used to store text, an **integer** stores a whole number (like 2 or -10), and a **float** stores a decimal number (like 1.0 or 3.16). There's also a **Boolean** data type that holds one of two alternatives, typically true or false (like Yes/No). To perform actions with these values, we use **operators**. You can use **arithmetic operators** such as +, -, *, and /, and Python processes these operations following a specific **order of precedence** like BIDMAS/BODMAS. Additionally, **comparison operators** like == (equivalent to), != (not equal to), > (greater than), and < (less than) allow your program to compare values. For more complex conditions, **logical operators** such as and, or, and not can be used to combine expressions.

10 Test your understanding questions

Here are 10 multiple-choice questions summarising the whole unit:

What does syntax refer to in text-based programming?

A. The speed at which the code runs, B. The rules or grammar of the programming language that must be followed, C. The visual appearance of the code, D. The number of variables used in a program.

Which Python command is primarily used to display text or values as output to the user?

A. input(), B. variable(), C. display(), D. print()

In Python, a variable is essentially:

A. A fixed value that never changes during program execution, B. A container that holds data or values which can change as the program is running, C. A type of mathematical operation used for calculations, D. A command used to exit a program.

If you need to store a whole number without any decimal places, such as 42 or -7, what Python data type would be most appropriate?

A. String, B. Integer, C. Float, D. Boolean

When Python performs calculations like $7 + 1 * 0 / 3$, what principle does it follow to determine the order of operations?

A. Operations are performed from left to right, B. The order is random each time the program runs, C. Operator precedence, commonly referred to as BIDMAS, D. The largest numbers are processed first.

To check if two values are equal to each other in Python, which comparison operator would you use?

A. =, B. !, C. >, D. ==

What is the main purpose of using selection (conditional statements) like IF, ELIF, and ELSE in programming?

A. To endlessly repeat a block of code, B. To allow programs to make decisions and execute specific code blocks based on whether a condition is true or false, C. To combine different data types together., D. To define new variables at runtime.

Which type of loop is best suited for indefinite iteration, meaning it repeats a block of code until a specific condition is met, rather than for a predetermined number of times?

A. FOR loop, B. WHILE loop, C. Sequence loop, D. Print loop

If you are writing a program that needs to repeatedly ask a user for a password until they enter the correct one, what combination of programming constructs would be most effective?

A. Only sequence and print() statements, B. Only selection (IF/ELSE) statements, C. Iteration (like a WHILE loop) combined with selection (IF/ELSE) to check the password, D. Using only string variables and arithmetic operators.

10 Test your understanding answers

1. B, 2. D, 3. B, 4. B, 5. C, 6. D, 7. B, 8. B, 9. C, 10. C