



INPUT VALIDATION AND CONDITIONALS

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Additional materials may be found at www.ncyte.net



INPUT VALIDATION AND CONDITIONALS

This module provides exposure to the concept of password validation and the use of conditional statements.

OVERVIEW

Prerequisite Knowledge: Students should have been introduced to strings, Booleans, user input and variables.

Length of Completion: The CCL is designed to take approximately 100-150 minutes.

Learning Setting: This lesson is intended for a face-to-face learning environment.

Lab Environment: This CCL is designed to be taught in a classroom which provides access to Internet-connected computers containing an Integrated Development Environment (IDE) consistent with class' chosen programming language.

Activity/Lab Tasks: Students will write a program or programs that implement the use of conditional statements involving variables, Booleans, user input and strings.

- 01.InputValidationandConditionals_Overview.docx
- 02.InputValidationandConditionals_Presentation.pptx
- 03.InputValidationandConditionals_CodeSegmentsandOutput_Activity.docx
- 04.InputValidationandConditionals_CodeSegmentsandOutput_ActivitySolutions.docx
- 05.InputValidationandConditionals_StringsandVariablesProgramming_Activity.docx
- 06.InputValidationandConditionals_StringsandVariablesProgramming_ActivitySolutions.docx





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LEARNING OBJECTIVES AND AP CSP ALIGNMENT

Lesson Learning Objectives

Students will:

1. Develop a program to validate passwords.,
2. Identify how a segment of program code functions.
3. Identify inputs and outputs in a program.
4. Represent a value with a variable.
5. Represent a string using a variable.
6. Write and evaluate conditional statements.

ASSOCIATED AP CSP SUB LEARNING OBJECTIVES

AP COMPUTER SCIENCE PRINCIPLES COURSE, BIG IDEA 1: CREATIVE DEVELOPMENT

- LO CRD-2.B Explain how a program or code segment functions.
 - CRD-2.B.1 A program is a collection of program statements that performs a specific task when run by a computer. A program is often referred to as software.
 - CRD-2.B.2 A code segment refers to a collection of program statements that are part of a program.
 - CRD-2.B.3 A program needs to work for a variety of inputs and situations.
 - CRD-2.B.4 The behavior of a program is how a program functions during execution and is often described by how a user
 - interacts with it.
- LO CRD-2.C Students will be able to identify inputs in a program.
 - CRD-2.C.1 Program input is data sent to a computer for processing by a program. Input can come in a variety of forms, such as tactile, audio, visual, or text.
 - CRD-2.C.4 Inputs usually affect the output produced by a program.
 - CRD-2.C.6 Input can come from a user or other programs.
- LO CRD-2.D Students will be able to identify outputs in a program.
 - CRD-2.D.1 Program output is any data sent from a program to a device. Program output can come in a variety of forms, such as tactile, audio, visual, or text.



- CRD-2.D.2 Program output is usually based on a program's input or prior state (e.g. internal values).
- LO CRD-2.J Identify inputs and corresponding expected outputs or behaviors that can be used to check the correctness of an algorithm or program.
 - CRD-2.J.1 In the development process, testing uses defined inputs to ensure that an algorithm or program is producing the expected outcomes. Programmers use the results from testing to revise their algorithms or programs.

AP COMPUTER SCIENCE PRINCIPLES COURSE, BIG IDEA 3: ALGORITHMS AND PROGRAMMING

- LO AAP-1.A Represent a value with a variable.
 - AAP-1.A.1 A variable is an abstraction inside a program that can hold a value. Each variable has associated data storage that represents one value at a time, but that value can be a list or other collection that in turn contains multiple values.
 - AAP-1.A.2 Using meaningful variable names helps with the readability of program code and understanding of what values are represented by the variables.
 - AAP-1.A.3 Some programming languages provide types to represent data, which are referenced using variables. These types include numbers, Booleans, lists, and strings.
- LO AAP-1.C Represent a list or string using a variable.
 - AAP-1.C.4 A string is an ordered sequence of characters.
- LO AAP-2.E For relationships between two variables, expressions, or values:
 - Write expressions using relational operators
 - Evaluate expressions that use relational operators
 - AAP 2.E.1 A Boolean value is either true or false
- LO AAP-2.H Students will be able to write and evaluate conditional statements.
 - AAP-2.H.1 Conditional statements or "if-statements" affect the sequential flow of control by executing different statements based on the value of a Boolean expression.

LESSON DETAILS



Overview of Lessons: The CCL is segmented into four sections. Sections one and two should be taught consecutively followed by an activity. Then part three should be taught followed by another activity. Section four includes a video and discussion questions on the implications of code.

Day 1:

- Presentation (Sections 1 and 2)
- Code Segments and Output Activity

Day 2:

- Presentation (Sections 3 and 4)
- Strings and Variables Programming Activity

LESSON 1

Presentation

02.InputValidationandConditionals_Presentation.pptx

The teacher should give the presentation and lead the discussion on sections one and two. These two sections should be taught back-to-back. Section one, "Review" includes the introduction and review (slides 1-6). Section two, "If, Else-if, and Else" includes instruction on if, else-if and else (slides 7-18).

Code Segments and Output Activity

03.InputValidationandConditionals_CodeSegmentsandOutput_Activity.docx

04.InputValidationandConditionals_CodeSegmentsandOutput_ActivitySolutions.doc

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Students should complete Code Segments and Output Activity immediately following instruction of slide 18. During this activity students read and interpret the code segments and write the appropriate output for each code segment. Once the activity is completed the teacher should check students' answers and redirect misunderstanding.

LESSON 2

Presentation

02.InputValidationandConditionals_Presentation.pptx



Teachers should then present section three, “Connection to Password” of the presentation (slides 19-22) to aid in the discussion of the input validation that websites use to check passwords. The Strings and Variables Programming Activity should begin immediately following slide 22. Once the activity is complete, the teacher should continue to section four, “Ethics”. Students should watch the video (runtime approximately 21 minutes), “The Impact of Code in Society” (link on slide 23) and answer the discussion questions. Note, discussion questions can be answered as a whole group, in small group, as a Think, Pair, Share or in individual journals.

Strings and Variables Programming Activity

05.InputValidationandConditionals_StringsandVariablesProgramming_Activity.docx
06.InputValidationandConditionals_StringsandVariablesProgramming_ActivitySolutions.docx

Teachers should assist each student individually as they progress towards a solution. Although sample programs are given, teachers should help each student use their creativity to arrive at a unique solution to the programming tasks. Example solutions are provided in the solutions document.

ACKNOWLEDGEMENTS

Resources:

[“2020-21 Updates to AP Computer Science Principles | AP Central — The College Board.”](#) *AP Central*. © 2019 College Board.

[“The Impact of Code in Society \(Joel Spolsky\)”](#) by [Devoxx FR](#). May 9, 2016.

