Lesson 10: Multi-Selection Statements

45 minutes

Overview

How can I specify different outcomes for different conditions?

Students expand their knowledge of selection statements to evaluate and implement multi-selection statements. Students explore the functionality of multi-selection statements and learn to use these to test a combination of conditions. Students use multi-selection statements to implement algorithms to solve problems.

Standards

Full Course Alignment

CSA Conceptual Framework

- **CON-2** - Programmers incorporate iteration and selection into code as a way of providing instructions for the computer to process each of the many possible input values

Agenda

Warm Up (5 minutes)
- **Evenly Divisible**

Activity (35 minutes)
- **Multi-Selection Statements**
- **Using Multi-Selection Statements**
- **Finding Patterns in Data**

Wrap Up (5 minutes)
- **Show What You Know Week**
- **Assessment: Check for Understanding**
- **AP Classroom Topic Questions**

Objectives

Students will be able to:

- Evaluate the result of code segments using multi-selection statements
- Write multi-selection statements to test multiple conditions

Preparation

- Print copies of the Finding Patterns handout (one for each student)
- Create code review groups if you are not reusing the same groups
- Print copies of the Unit 4 Study Guide (one for each student)
- Check the **Teacher's Lounge** for verified teachers on the CSA Forum to find additional strategies or resources shared by fellow teachers

Links

Heads Up! Please make a copy of any documents you plan to share with students.

For the students

- **Finding Patterns** - Handout
- **Multi-Selection Statements** - Video
- **U4L10 Extra Practice** - Handout
- **Unit 4 Study Guide** - Resource

Vocabulary

- **multi-selection statement** - a statement that selects a single

action from three or more conditional statements based on which Boolean expression is `true`

Teaching Guide

Warm Up (5 minutes)

Evenly Divisible

Discuss: Click through the animated slide to display the prompts.

- *The owner of the Project Mercury Pastries Food Truck business wants to find all orders with quantities that are multiples of 12. How would we write the condition to find these orders?*

Discussion Goal: Students suggest using the mod operator to check if there is a remainder from dividing the quantity by 12. If there is no remainder, they can return that order or add it to an array to keep track of all orders found.

Teaching Tip

Ask students guiding questions to help identify using the mod (`%`) operator for this condition. For example,

- *How do we know that a number is a multiple of 12?*
- *What does it mean for a number to be evenly divisible by another number? Should there be a remainder?*
- *What could we use to check if a number is evenly divisible by another number?*

Activity (35 minutes)

Multi-Selection Statements (10 minutes)

Remarks

> We have learned different ways to expand the capabilities of conditionals to check multiple conditions throughout this unit. We know how to use one-way and two-way selection statements to decide what code to execute based on the result of a condition. We can also use multi-selection statements to check multiple conditions.

Do This: Review the lesson objectives.

Group: Place students in pairs.

Do This: Direct students to Level 1 on Code Studio to investigate the program with a partner. Students make the changes to the program as prompted.

1 **Investigate: Multi-Selection Statements**

Display: Show the video – *Multi-Selection Statements*.

Do This: Define *multi-selection statement*.

Do This: Explain the flowchart for a multi-selection statement.

Using Multi-Selection Statements (15 minutes)

Remarks

> At the beginning of the lesson, we discussed using the mod operator to check if a value is evenly divisible by another value. This algorithm is useful for various scenarios, including analyzing data to find patterns and information.

Do This: Have students write pseudocode for identifying if a value is or is not evenly divisible by another value.

Do This: Direct students to Level 2 on Code Studio to complete Levels 2 and 3. Students implement their algorithm on Level 2, then complete a choice level on Level 3.

2-3 **Using Multi-Selection Statements**

2 3

Finding Patterns in Data (10 minutes)

Remarks

> In a previous lesson, you identified a dataset to use for your unit project. When software engineers create visualizations of data, they first identify the patterns and relationships they see in the data that they want to illustrate. These patterns and relationships help tell the story about the data.

Distribute: Give each student a copy of the Finding Patterns handout.

Do This: Direct students to Level 4 on Code Studio. Students review their selected dataset and complete the Finding Patterns handout to identify the patterns and relationships they notice in the data.

4 **Finding Patterns in Data**

Wrap Up (5 minutes)

Show What You Know Week

Remarks

> The next five lessons are an opportunity to Show What You Know! We begin with the unit project, then spend a day practicing answering AP-style free-response questions and wrapping up the unit with a multiple-choice assessment. You've learned so much in this unit, and now you're ready to show what you know!

Distribute: Give each student a copy of the Unit 4 Study Guide.

Do This: Introduce the Show What You Know week.

Do This: Introduce the Abstract Data Art Project.

Do This: Review the concepts covered in this lesson.

Display: Key Vocabulary

Assessment: Check for Understanding

Check For Understanding Question(s) and solutions can be found in each lesson on Code Studio. These questions can be used for an exit ticket.

Check for Understanding

AP Classroom Topic Questions

To assign questions from the AP Classroom Question Bank that align with this lesson, create a custom quiz in AP Classroom by searching the Question Bank for the Essential Knowledge statements listed at the top of this lesson plan. You can find instructions and video demonstrations to do this on **AP Central**.

The following Topic Questions in AP Classroom can be assigned as a formative assessment for this lesson:

- Topic Questions 3.4

Note: *Some Learning Objectives and Essential Knowledge statements in the suggested Topic Questions are covered in later units.*