Lesson 1: Introduction to Linear Search

In this lesson, learners are introduced to one of the two searching algorithms they need to know about - linear search. They will go over the steps of carrying out a linear search, and perform a linear search in real life and with a sample of data.

They will look into how searching is a common activity for both computers and humans and discuss how the instructions can differ when the items are unordered or ordered. At this point linear search will be introduced as the only reasonable way to search through an unordered list of items before being shown a demonstration in the slides using a number hidden under a row of cups.

Learners will follow the instructions of a linear search themselves with a set of 10 cards in small groups. Afterwhich, they will be introduced to the best and worst-case scenario of the performance of an algorithm before carrying out a linear search on a small sample of data.

## **Objectives:**

- Identify why computers often need to search data

- Describe how linear search is used for finding the position of an item in a list of items

- Perform a linear search to find the position of an item in a list

## **Materials:**

- Slides or projector

- Cups

- Number cards (1-10)

- Sample data set (e.g., a list of names or numbers)

## **Bell-Ringer Activity:**

- Ask students to think about a time when they had to search for something (e.g., a book in a library, a specific item in a store). Discuss with a partner or in small groups why searching is important and how it can be challenging.

## **Introduction:**

- Explain to students that in this lesson, they will be learning about linear search, one of the two searching algorithms they need to know.

- Discuss how searching is a common activity for both computers and humans, and how the instructions can differ when the items are unordered or ordered.

- Introduce linear search as the only reasonable way to search through an unordered list of items.

- Show a demonstration using a number hidden under a row of cups to illustrate the concept of linear search.

## **Direct Instruction:**

- Present slides or use a projector to explain the steps of carrying out a linear search.

- Discuss the importance of understanding the steps and the logic behind them.

- Provide examples of how linear search can be used in real-life situations.

## **Guided Practice:**

- Divide students into small groups.

- Distribute a set of 10 number cards to each group.

- Instruct students to perform a linear search to find the position of a specific number in the set of cards.

- Circulate among the groups to provide guidance and support as needed.

## **Independent Practice:**

- Introduce the concept of best and worst-case scenarios in the performance of an algorithm.

- Explain how the performance of a linear search can vary depending on the position of the item being searched for.

- Provide a small sample data set (e.g., a list of names or numbers) and ask students to perform a linear search to find the position of a specific item.

- Encourage students to analyze the performance of the algorithm based on the position of the item.

## **Exit Ticket:**

- Ask students to write a brief explanation of why linear search is used for finding the position of an item in a list of items.

- Collect the exit tickets to assess students' understanding of the concept.

## **Closure:**

- Recap the main points of the lesson, emphasizing the importance of linear search in finding the position of an item in a list.

- Connect the concept of linear search to real-life scenarios where searching is necessary.

- Encourage students to practice and apply their knowledge of linear search in various situations.

## **Common Core Standards:**

- CCSS.ELA-LITERACY.RST.9-10.3: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

- CCSS.ELA-LITERACY.RST.9-10.4: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 9-10 texts and topics.