Lesson 5: Insertion Sort

In this lesson, students will learn about insertion sort, a sorting algorithm used to order a list of items. They will understand the concept of inserting a new item into a sorted group and recognize the importance of recognizing and highlighting sublists at different stages of an insertion sort. Through guided and independent practice, students will gain hands-on experience in performing insertion sorts on different data sets, reinforcing their understanding of the algorithm. The lesson will conclude with a recap of the main points and an encouragement for students to continue practicing insertion sorts to solidify their knowledge.

## **Objectives:**

- Insert an item into an ordered list of items.

- Describe how insertion sort is used for ordering a list of items.

- Perform an insertion sort to order a list containing sample data.

## **Materials:**

- Slides or whiteboard

- Markers or chalk

- Sample data sets (words instead of numbers)

- Worksheets or paper for independent practice

## **Bell-Ringer Activity:**

- Ask the students to think about how they would sort a group of objects in real life.

- Allow a few students to share their ideas.

- Guide the discussion towards the concept of inserting a new item into a sorted group of objects.

## **Introduction:**

- Explain to the students that they will be learning about a sorting algorithm called insertion sort.

- Mention that some exam boards may not require knowledge of insertion sort, so it's important to check the specifications.

- Explain that insertion sort is similar to how we sort objects in real life by inserting a new item into a sorted group.

- Emphasize the importance of recognizing and highlighting sublists at different stages of an insertion sort.

## **Direct Instruction:**

- Present slides or use the whiteboard to explain a broken down version of one pass of an insertion sort.

- Show the students the coded solution that will be introduced in the next lesson.

- Demonstrate multiple passes of an insertion sort to help students understand the algorithm.

- Provide examples and explanations to help students recognize and highlight sublists at different stages of an insertion sort.

## **Guided Practice:**

- Divide the students into pairs or small groups.

- Provide each group with a sample data set (words instead of numbers) and a partially worked example.

- Instruct the students to perform an insertion sort on the given data set, following the steps shown in the example.

- Circulate the classroom to provide guidance and support as needed.

## **Independent Practice:**

- Distribute worksheets or paper to each student.

- Ask the students to perform an insertion sort on a different data set provided on the worksheet.

- Encourage the students to work independently and use the partially worked example as a reference.

- Collect the completed worksheets or papers for assessment.

## **Exit Ticket:**

- Give each student a small slip of paper.

- Ask them to write down one thing they learned about insertion sort during the lesson.

- Collect the exit tickets as the students leave the classroom.

## **Closure:**

- Recap the main points of the lesson, including the objectives and the steps of an insertion sort.

- Emphasize the importance of recognizing and highlighting sublists at different stages of an insertion sort.

- Encourage the students to practice performing insertion sorts on different data sets to reinforce their understanding.

- Thank the students for their participation and effort in the lesson.