Computing

Lesson 8: Insertion Sort

Algorithms

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Materials from the Teach Computing Curriculum created by the National Centre for Computing Education

Task 1 - Inserting an item

Inserting a card

In this task, you need to show how a list of ordered cards changes after inserting a card from the unordered pile into the correct position. The cards should be in order from lowest to highest, with aces considered low.

Task 1 - Inserting an item

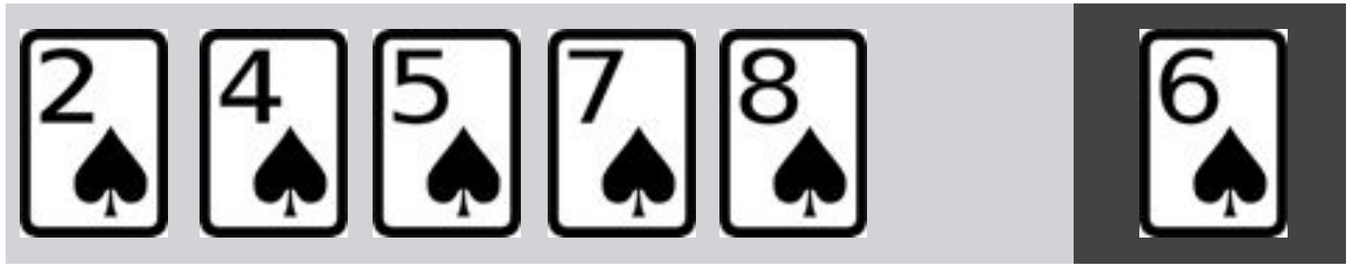
The instructions for inserting one card in the correct position can be written as:

1. Retrieve a card from the unsorted pile.
2. Make room for the card in the sorted list.
3. Insert the card into the correct position in the list.

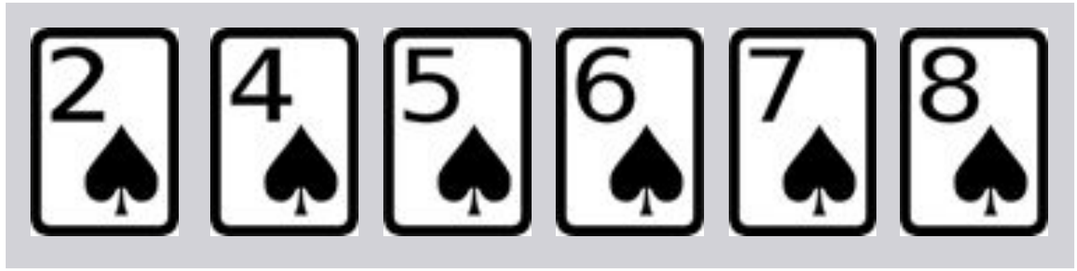
The first one has been completed for you.

Task 1 - Inserting an item

The first one has been completed for you.

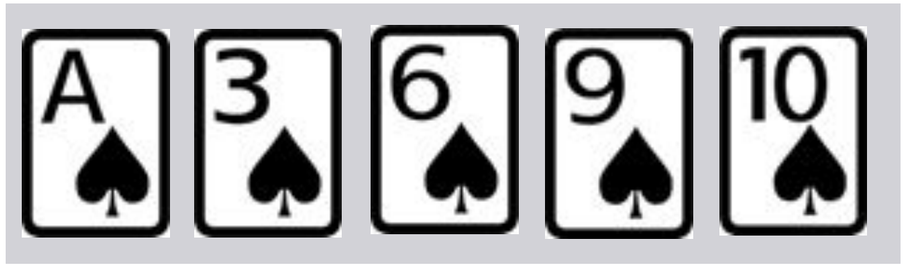


Sorted cards **Unsorted pile**



Task 1 - Inserting an item

Insert the card from the unsorted pile into the sorted cards below:



Sorted cards

Unsorted pile

Task 1 - Inserting an item

Insert the card from the unsorted pile into the sorted cards below:

Sorted cards

Unsorted pile

Task 1 - Inserting an item

Describe what you think would happen to the list above if you then wanted to insert another card, the ace of spades, after you had inserted the 9 of spades.

Task 2 - Executing an insertion sort - part 1

Sorting a list of names

Katie has created a program that uses a file to store the names of people who have completed her game.

A sample of data is shown in **Figure 1**.

Rhonda	Vicky	Jorge	Toby	Ada	Fatima

Figure 1

Task 2 - Executing an insertion sort - part 1

Carry out an insertion sort on the data shown in **Figure 1** by filling in the table below. Each row should show **one pass** of the algorithm and any elements that have changed position. You should also shade or highlight the elements that are in the sorted sublist.

The initial sorted sublist and first pass has been completed for you.

Task 2 - Executing an insertion sort - part 1

Rhonda	Vicky	Jorge	Toby	Ada	Fatima
Rhonda	**Vicky**	Jorge	Toby	Ada	Fatima

Task 2 - Executing an insertion sort - part 1

State the total number of passes made when executing an insertion sort on the data shown in **Figure 1**.

Task 2 - Executing an insertion sort - part 2

Sort by cuisine

Andre is developing a program for a food delivery service. The system allows users to select from a list of cuisines from around the world.

A sample of data is shown in **Figure 2**.

Persian	Greek	Indian	Thai	Nigerian	Italian	Spanish

Figure 2

Task 2 - Executing an insertion sort - part 1

State the cuisine that will be in the sorted sublist to start with when executing an insertion sort on the data shown in **Figure 2**.

On the next slide, show all of the stages of an insertion sort when applied to the data shown in **Figure 2**.

Task 2 - Executing an insertion sort - part 1