

Computing

# Lesson 10: Merge Sort

**Algorithms**

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



# Task 1 - Merging two lists of cards

In this task you need to show each step of how two lists of cards could be merged into a new list. The instructions for carrying this out can be written as:

1. Take two lists of data to be merged.
2. Create a new empty list for the merged items.
3. Repeat steps a to b until one of the lists of items is empty:
  - a. Compare the first items of the two lists.
  - b. Remove the item that is lower and place it into the merged list, in the next available position.
4. Then place each item from the remaining list into the merged list, in order.



# Task 1 - Merging two lists of cards

Each step should show the cards remaining in List 1 and List 2 and which card has been added to the merged list. The first two steps have been completed for you.



# Task 1 - Merging two lists of cards

List 1:



List 2:



Merged list:



# Task 1 - Merging two lists of cards

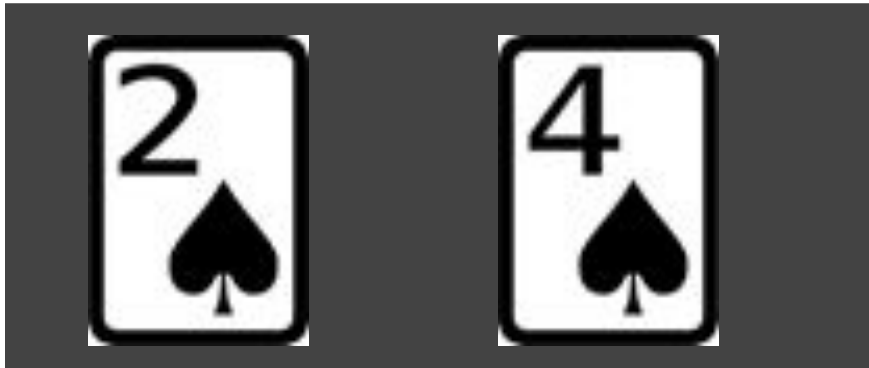
List 1:



List 2:

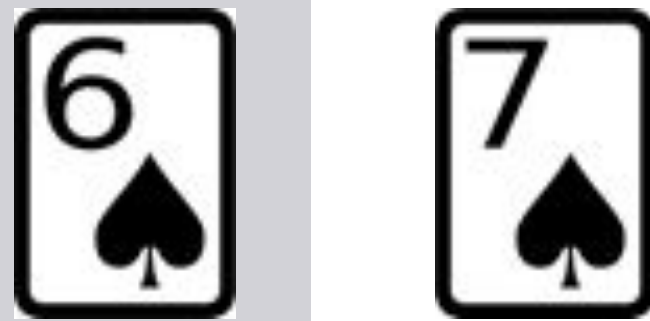


Merged list:

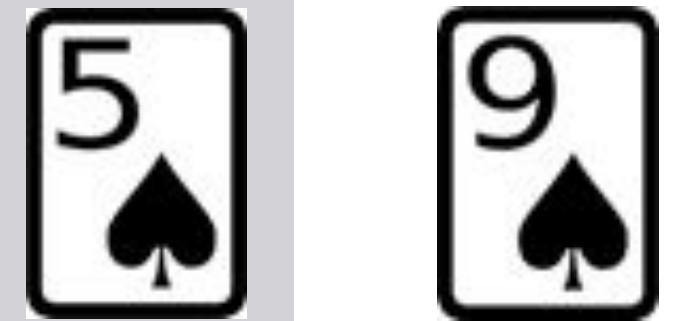


# Task 1 - Merging two lists of cards

List 1:



List 2:

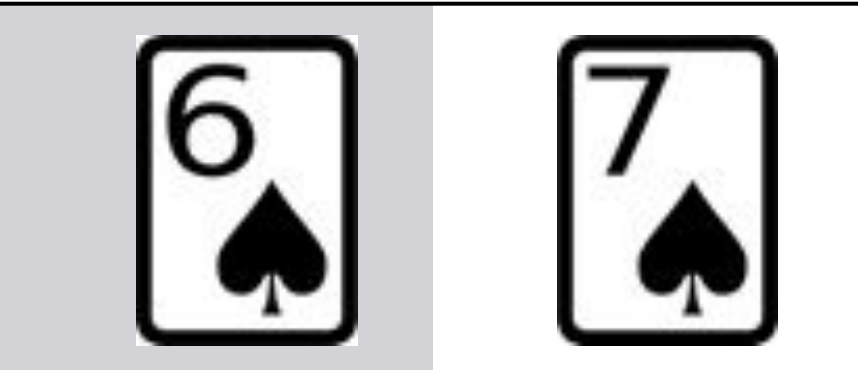


Merged list:



# Task 1 - Merging two lists of cards

List 1:



List 2:

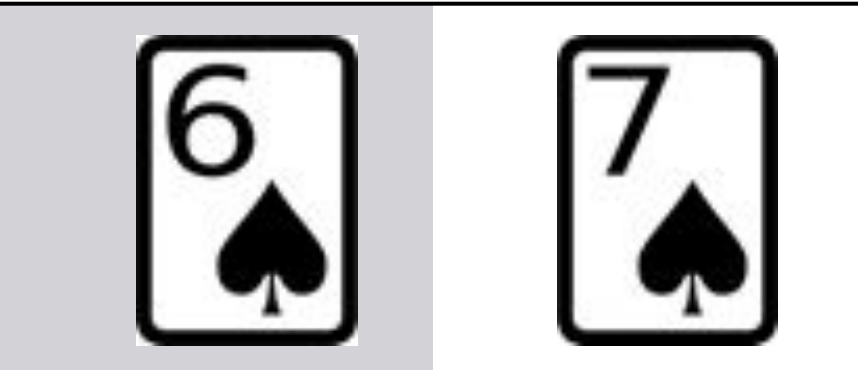


Merged list:



# Task 1 - Merging two lists of cards

List 1:



List 2:



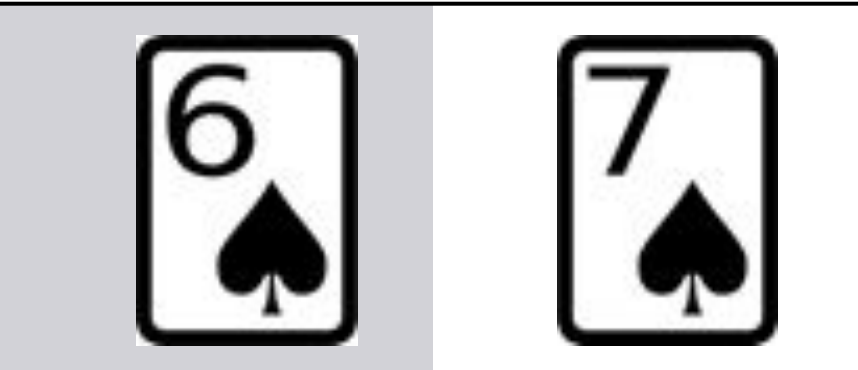
Merged list:





# Task 1 - Merging two lists of cards

List 1:



List 2:



Merged list:



## Task 2 - Executing a merge sort - part 1

Dog breeds

Ayuk has collected data about the different breeds of dog he has seen in his area, for a local animal charity. A sample of data is shown in **Figure 1**.

Poodle	Bulldog	Maltese	Pug	Sheltie	Boxer	Husky
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Figure 1



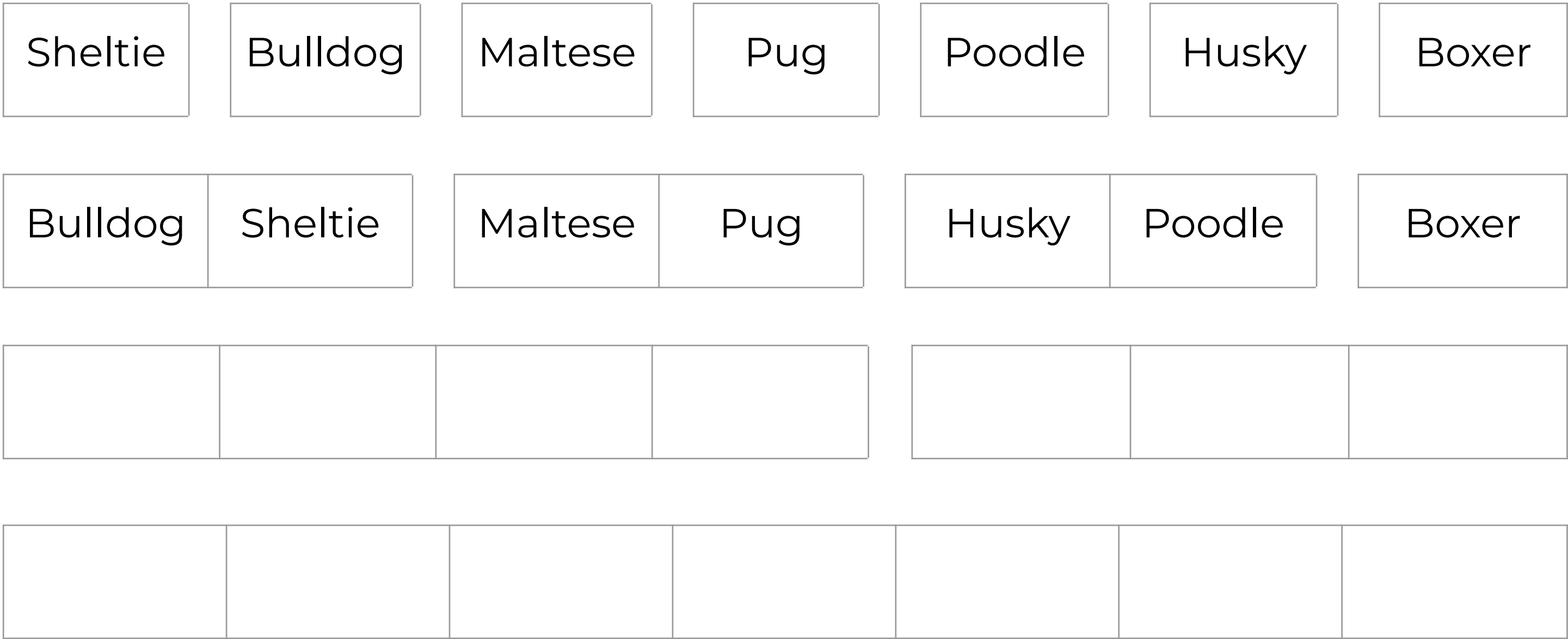
# Task 2 - Executing a merge sort - part 1

Perform a merge sort on the data shown in **Figure 1** by filling in the table below. A row should show each pair of lists that have been merged together.

The first stages of splitting each item into a list of its own has already been done, and the first row of merges has been completed for you.



# Task 2 - Executing a merge sort - part 1



## Task 2 - Executing a merge sort - part 1

**State** the total number of merges that took place when executing a merge sort on the data shown in **Figure 1**.

**State** the number of new lists that were created during the merge part of the algorithm.



## Task 2 - Executing a merge sort - part 2

### Crossword

Jennifer is developing a program that randomly generates a crossword based on a database of words. She is currently writing a script to check all the four-letter words. A sample of data is shown in **Figure 2**.

Peak	Tech	Holy	Film	Seen	Neck	Pace	Bulk	Moon
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Figure 2



## Task 2 - Executing a merge sort - part 2

Perform a merge sort on the data shown in **Figure 2** by filling in the table below. A row should either show each list that has been split in half, or each pair of lists that has been merged together.



# Task 2 - Executing a merge sort - part 2

Peak	Tech	Holy	Film	Seen	Neck	Pace	Bulk	Moon





# Task 2 - Executing a merge sort - part 2

