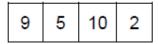Using your knowledge of how a bubble sort operates and of how a merge sort operates, demonstrate how the following data would be sorted using both methods, clearly describing each step:

| 9 | 5 | 10 | 2 |

2017 Sort exam Q MS **8 marks**

Merge:

  9 5 10 2

1. **First the list is split in half and split again in half**

  9 5 10 2

9 5 10 2 **1 mark**

2. **First two items are compared, resulting in 9 and 5 swapping positions**
3. **Final two items are compared, resulting in 10 and 2 swapping positions**

5 9 2 10 (**2 marks**)

4. **First item in each list is then compared, so 5 and 2 are compared. 2 is smaller so is merged to position one in the new list**
• **The first item of both lists (5 and 10) are compared. 5 is smaller so is merged to position 2 of the next list.**
• **Remaining numbers are compared. 9 is smaller than 10 so is merged into position 3 of new list. 10 is merged to the new list at the end**

2 5 9 10 **1 mark**

Bubble:

  9 5 10 2

1. First and 2nd item are compared. 5 is smaller than 9 so they swap positions. 9 and 10 are compared and no swap is made.

5 9 10 2 **1 mark**

2. 10 and 2 are compared and a swap is made as 2 is smaller than 10.

5 9 **2 10** **1 mark**

3. 5 and 9 are compared and no swap is made. 9 and 2 are compared and swapped as 2 is smaller than 9. 9 and 10 remain in position – no swap is needed.

5 **2 9** 10   **1 mark**

4. 5 and 2 are compared and swapped as 2 is smaller than 5. No more swaps are required as each adjacent number is now in numerical order

2 5 9 10   **1 mark**