# Computer Architecture

## Assignment-2

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## Report

The algorithm used to sort the array: Bubble sort.

## Input format :

1. Enter N.

2. Starting memory address X of the input numbers

3. Starting memory address Y of the output sorted numbers.

## C++ version of the MIPS program :

```cpp
void bubblesort(int arr[], int n)
{
    for(int i = 0; i < n - 1; i++)
        for(int j = 0; j < n - i - 1; j++)
            if(arr[j] > arr[j + 1])
                swap(arr[j], arr[j + 1])
}
```
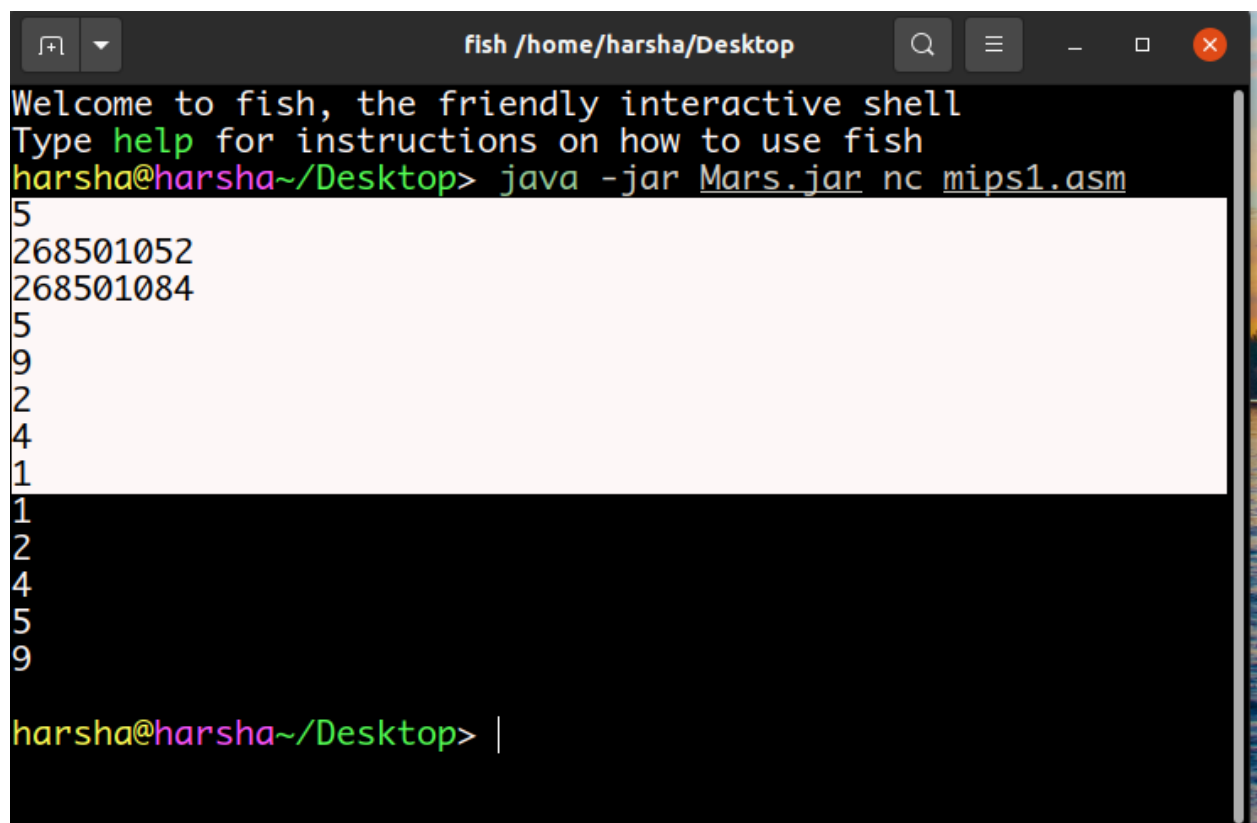
## Explanation of the MIPS program:

$t1 contains N
$t2 contains X
$t3 contains Y

- First, we copy the numbers from the locations X, X + 4 .... to Y, Y+4  by loading the number into a register and storing the number in destination memory locations.
- Next, we sort our array using bubble sort.
- We swap the consecutive numbers if they are not in increasing order.

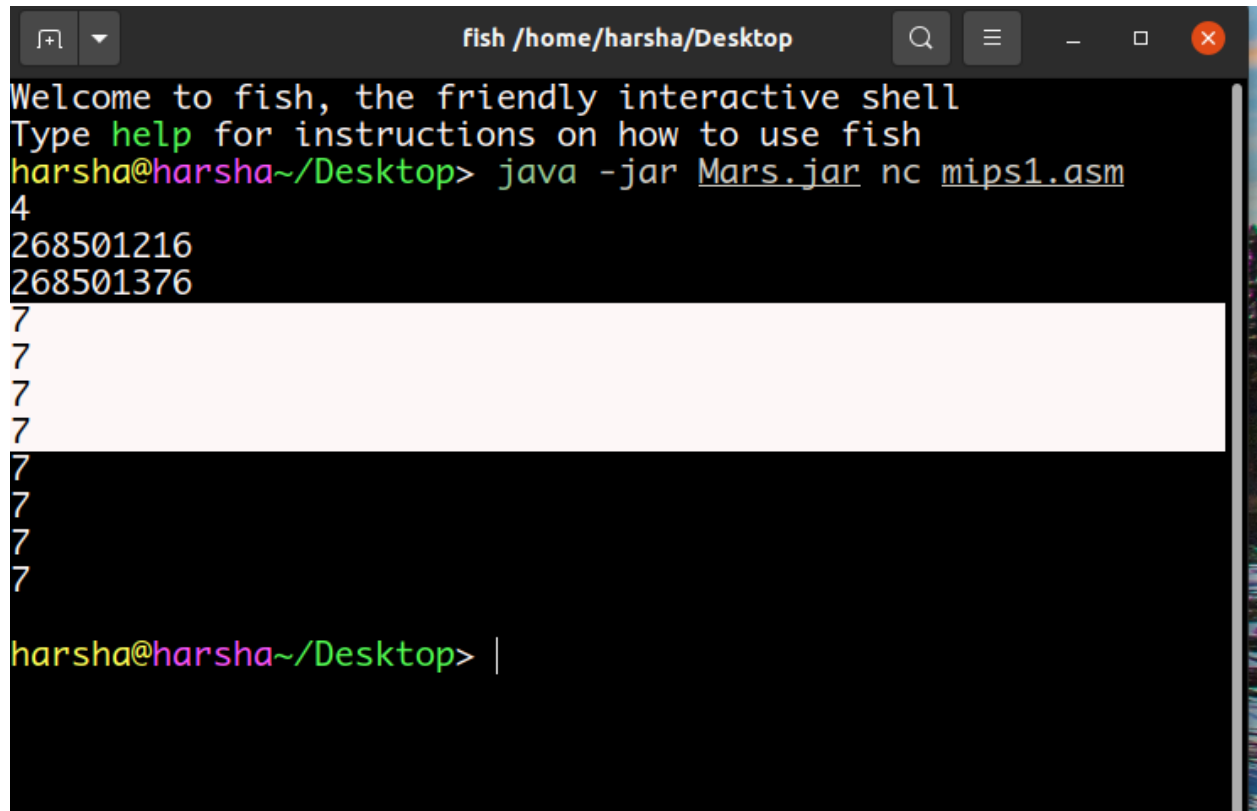## Screenshots of various test cases:

## Test case - 1

## Test case - 2



```
Welcome to fish, the friendly interactive shell
Type help for instructions on how to use fish
harsha@harsha~/Desktop> java -jar Mars.jar nc mips1.asm
10
268501056
268501472
4
2
5
23
253
2
89
223
12
7
2
2
4
5
7
12
23
89
223
253

harsha@harsha~/Desktop>
```

Test case - 3



Caption: fish /home/harsha/Desktop

```
Welcome to fish, the friendly interactive shell
Type help for instructions on how to use fish
harsha@harsha~/Desktop> java -jar Mars.jar nc mips1.asm
4
268501216
268501376
7
7
7
7
7
7
7
7

harsha@harsha~/Desktop> |
```