

Assignment Day 5

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Question 1

1. Write the function for insertion sort.

ANSWER:-

- **Step 1** – If the element is the first one, it is already sorted.
- **Step 2** – Move to next element
- **Step 3** – Compare the current element with all elements in the sorted array
- **Step 4** – If the element in the sorted array is smaller than the current element, iterate to the next element. Otherwise, shift all the greater element in the array by one position towards the right
- **Step 5** – Insert the value at the correct position
- **Step 6** – Repeat until the complete list is sorted

```
#include <math.h>
#include <stdio.h>

/* Function to sort an array using insertion sort*/
void insertionSort(int arr[], int n)
{
    int i, key, j;
    for (i = 1; i < n; i++) {
        key = arr[i];
        j = i - 1;

        /* Move elements of arr[0..i-1], that are
        greater than key, to one position ahead
        of their current position */
        while (j >= 0 && arr[j] > key) {
            arr[j + 1] = arr[j];
            j = j - 1;
        }
        arr[j + 1] = key;
    }
}
```

```
// A utility function to print an array of size n
void printArray(int arr[], int n)
{
    int i;
    for (i = 0; i < n; i++)
        printf("%d ", arr[i]);
    printf("\n");
}

/* Driver program to test insertion sort */
int main()
{
    int arr[] = { 12, 11, 13, 5, 6 };
    int n = sizeof(arr) / sizeof(arr[0]);

    insertionSort(arr, n);
    printArray(arr, n);

    return 0;
}
```

OUTPUT:-

```
5 6 11 12 13
```