



## Assignment Solutions | Problems on sorting | Week 9

1. What is an in-place sorting algorithm?
  - a) It needs  $O(1)$  or  $O(\log n)$  memory to create auxiliary locations
  - b) The input is already sorted and in-place
  - c) It requires additional storage
  - d) It requires additional space

Solution :

a) It needs  $O(1)$  or  $O(\log n)$  memory to create auxiliary locations.

2. In the following scenarios, when will you use selection sort?
  - a) The input is already sorted
  - b) A large file has to be sorted
  - c) Large values need to be sorted with small keys
  - d) Small values need to be sorted with large keys

Solution :

c) Large values need to be sorted with small keys.

3. Given an integer array and an integer  $k$  where  $k \leq \text{size of array}$ , We need to return the  $k$ th smallest element of the array.

Solution :

```

#include <iostream>
using namespace std;

void insertionSort(int arr[], int n){
    int i, key, j;
    for (i = 1; i < n; i++){
        key = arr[i];
        j = i - 1;

        while (j >= 0 && arr[j] > key){
            arr[j + 1] = arr[j];
            j = j - 1;
        }
        arr[j + 1] = key;
    }
}

int main() {
    int arr[5]={7,2,32,5,20};
    int size=5;
    int k=3;
    insertionSort(arr,5);
    cout<<arr[k-1]<<endl;
    return 0;
}

```

4. Find the minimum operations required to sort the array in increasing order. In one operation , you can set each occurrence of one element to 0.

Solution :

5. Given an array, arr[] containing n integers, the task is to find an integer (say K) such that after replacing each and every index of the array by  $|a_i - K|$  where ( $i \in [1, n]$ ), results in a sorted array. If no such integer exists that satisfies the above condition then return -1.

Solution :

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