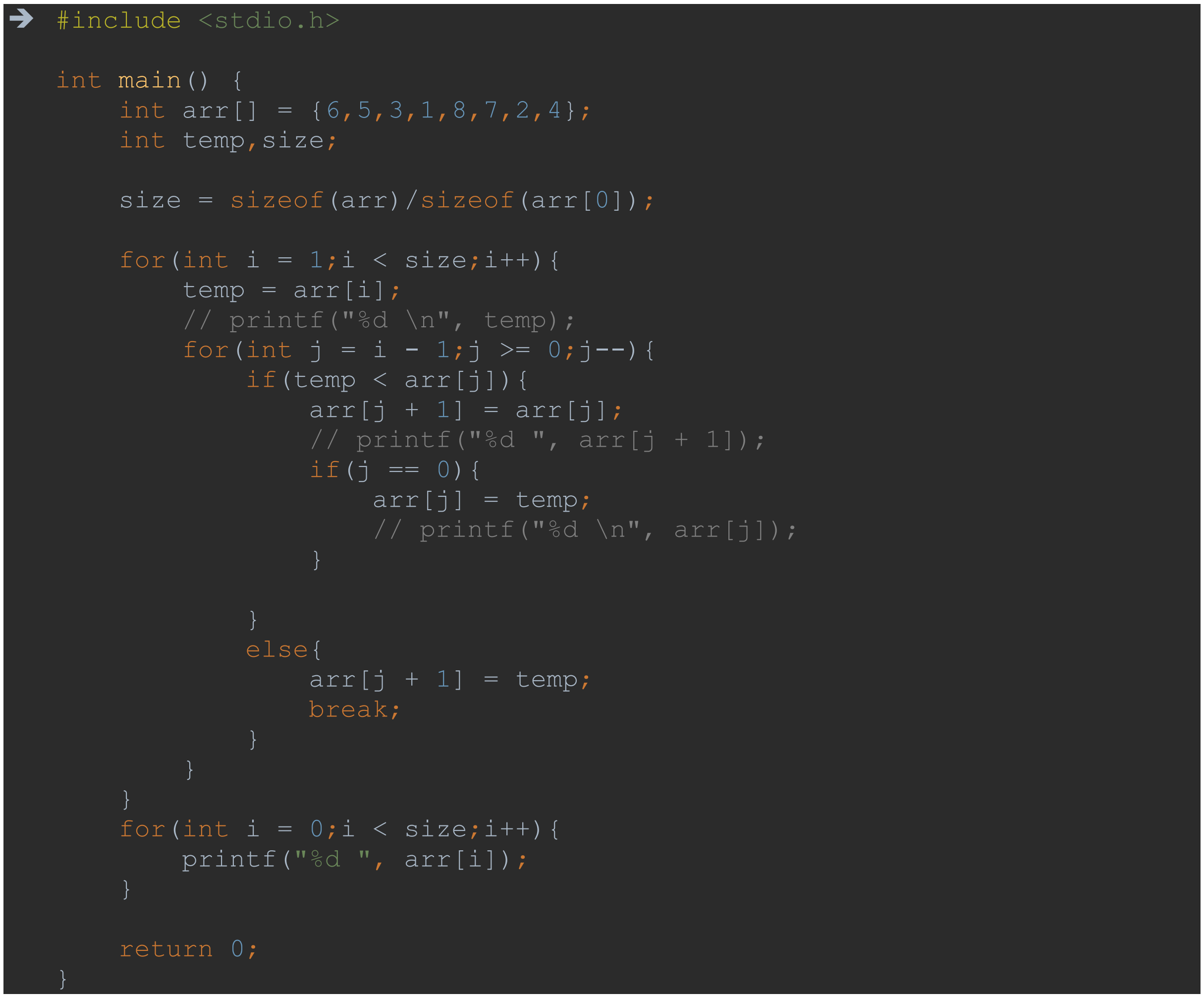
214189E – SENARATHNA G.G.P.C.

B21-S2-IN1111 - Data Structures and Algorithms.

Sorting Algorithms,

➔Insertion Sort

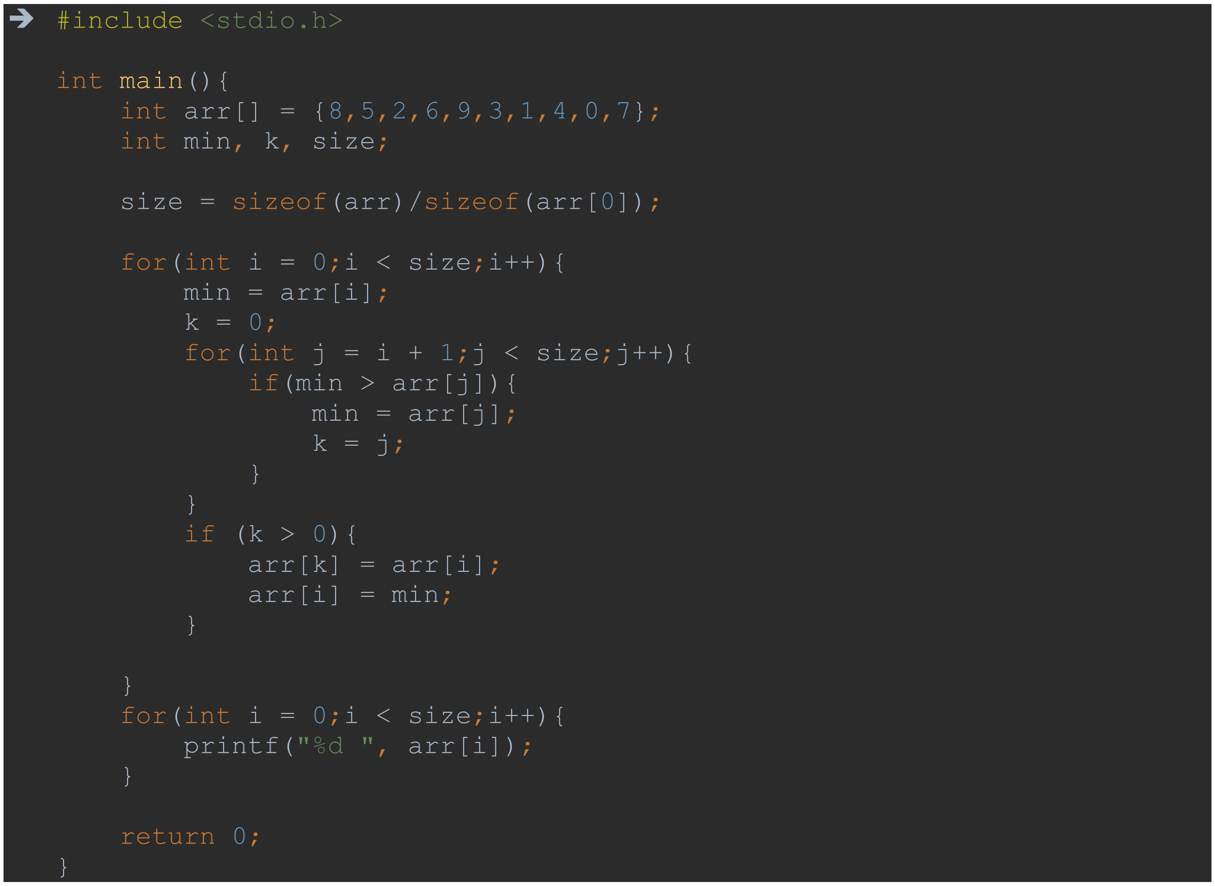


```
#include <stdio.h>

int main() {
    int arr[] = {6,5,3,1,8,7,2,4};
    int temp,size;

    size = sizeof(arr)/sizeof(arr[0]);

    for(int i = 1;i < size;i++){
        temp = arr[i];
        // printf("%d \n", temp);
        for(int j = i - 1;j >= 0;j--){
            if(temp < arr[j]){
                arr[j + 1] = arr[j];
                // printf("%d ", arr[j + 1]);
                if(j == 0){
                    arr[j] = temp;
                    // printf("%d \n", arr[j]);
                }

            }
            else{
                arr[j + 1] = temp;
                break;
            }
        }
    }
    for(int i = 0;i < size;i++){
        printf("%d ", arr[i]);
    }

    return 0;
}
```

execution time,

- Best – 109 ms
- Worst – 136 ms
- Average – 125 ms

➔ Selection Sort,



```c
#include <stdio.h>

int main(){
    int arr[] = {8,5,2,6,9,3,1,4,0,7};
    int min, k, size;

    size = sizeof(arr)/sizeof(arr[0]);

    for(int i = 0;i < size;i++){
        min = arr[i];
        k = 0;
        for(int j = i + 1;j < size;j++){
            if(min > arr[j]){
                min = arr[j];
                k = j;
            }
        }
        if (k > 0){
            arr[k] = arr[i];
            arr[i] = min;
        }

    }
    for(int i = 0;i < size;i++){
        printf("%d ", arr[i]);
    }

    return 0;
}
```

execution time,

- Best – 113 ms
- Worst – 110 ms
- Average – 110 ms

➔ Bubble Sort,

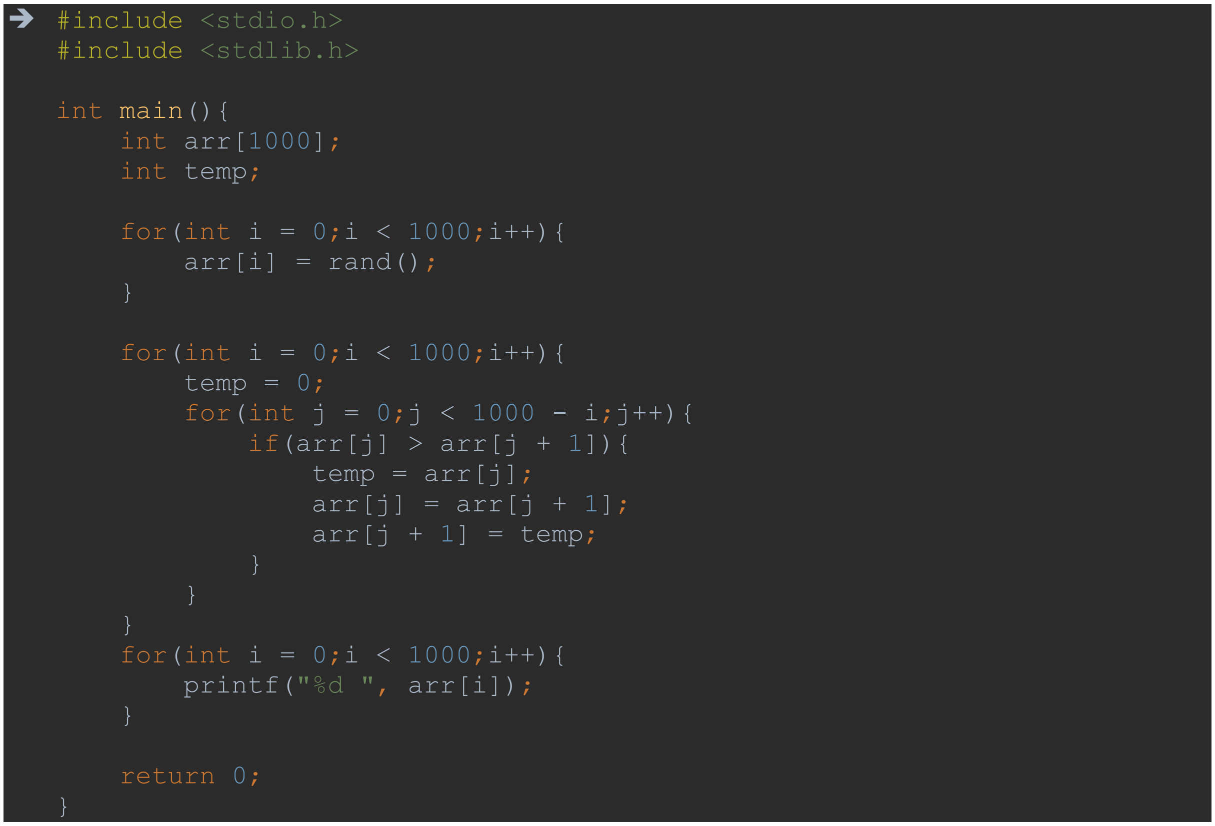
```
#include <stdio.h>

int main(){
    int arr[] = {6,5,3,1,8,7,2,4};
    int temp, size;

    size = sizeof(arr)/sizeof(arr[0]);

    for(int i = 0;i < size;i++){
        temp = 0;
        for(int j = 0;j < size - i;j++){
            if(arr[j] > arr[j + 1]){
                temp = arr[j];
                arr[j] = arr[j + 1];
                arr[j + 1] = temp;
            }
        }
    }
    for(int i = 0;i < size;i++){
        printf("%d ", arr[i]);
    }

    return 0;
}
```

execution time,

- Best – 93 ms
- Worst – 94 ms
- Average – 94 ms

Randomly Generate

➔Bubble Sort



```c
#include <stdio.h>
#include <stdlib.h>

int main(){
    int arr[1000];
    int temp;

    for(int i = 0;i < 1000;i++){
        arr[i] = rand();
    }

    for(int i = 0;i < 1000;i++){
        temp = 0;
        for(int j = 0;j < 1000 - i;j++){
            if(arr[j] > arr[j + 1]){
                temp = arr[j];
                arr[j] = arr[j + 1];
                arr[j + 1] = temp;
            }
        }
    }
    for(int i = 0;i < 1000;i++){
        printf("%d ", arr[i]);
    }

    return 0;
}
```