1.main.c

```
#include <stdio.h>
#include <stdlib.h>
#include "header.h"

int main(){
   array a;
   init(&a, 5);
   append(&a, 5);
   append(&a, 8);
   append(&a, 9);
   append(&a, 2);
   append(&a, 3);
   printf("Unsorted array: \n");
   print_array(&a);
   insertion_sort(&a);
   printf("Sorted array: \n");
   print_array(&a);
   return 0;
}
```

2.header.h

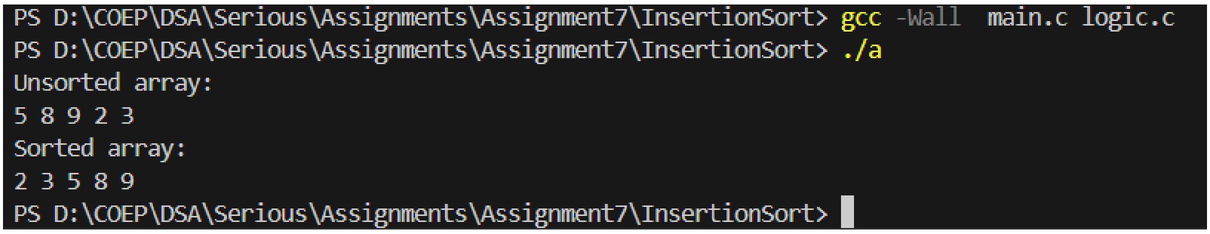
```
typedef struct{
   int *A;
   int size;
   int len;
}array;
void init(array *arr, int size);
void append(array *arr, int d);
void insertion_sort(array *arr);
void print_array(array *arr);
```

3.logic.c

```
#include <stdio.h>
#include <stdlib.h>
#include "header.h"

void init(array *arr, int size){
    arr -> A = (int *)malloc(sizeof(int) * size);
    arr -> size = size;
    arr -> len = 0;
}

void append(array *arr, int d){
    if(arr -> len < arr -> size){
        arr -> A[arr -> len++] = d;
    }
}

void insertion_sort(array *arr) {
    int i, j, key;
    for (i = 1; i < arr->len; i++) {
        key = arr->A[i];
        j = i - 1;

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

```
void print_array(array *arr) {
    for (int i = 0; i < arr->len; i++) {
        printf("%d ", arr->A[i]);
    }
    printf("\n");
}
```

Output:



```
PS D:\COEP\DSA\Serious\Assignments\Assignment7\InsertionSort> gcc -Wall  main.c logic.c
PS D:\COEP\DSA\Serious\Assignments\Assignment7\InsertionSort> ./a
Unsorted array:
5 8 9 2 3
Sorted array:
2 3 5 8 9
PS D:\COEP\DSA\Serious\Assignments\Assignment7\InsertionSort>
```