C Language Test 1

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Contents

1 Question-1

Write a program that declares a pointer to an integer and passes it to a function. The function should increment the value of the integer using the pointer, and the program should print the updated value.

1.1 Code

```
#include<stdio.h>
int *ptr , a;
void increment(int i);

int main()
{
  printf("Enter the value of a = ");
  scanf("%d",&a);
  ptr = &a ; //Assigning the address to pointer
  increment(*ptr); //Dereferencing the pointer
  return 0;
}

void increment(int i)
{
  *ptr = i + 1 ; //incrementing the value 'a'
  printf("Value of Incremented a = %d",*ptr);
}
```

1.2 Inputs and Output

Enter the value of **a = 20**
Value of Incremented **a = 21**[Fig: 2]

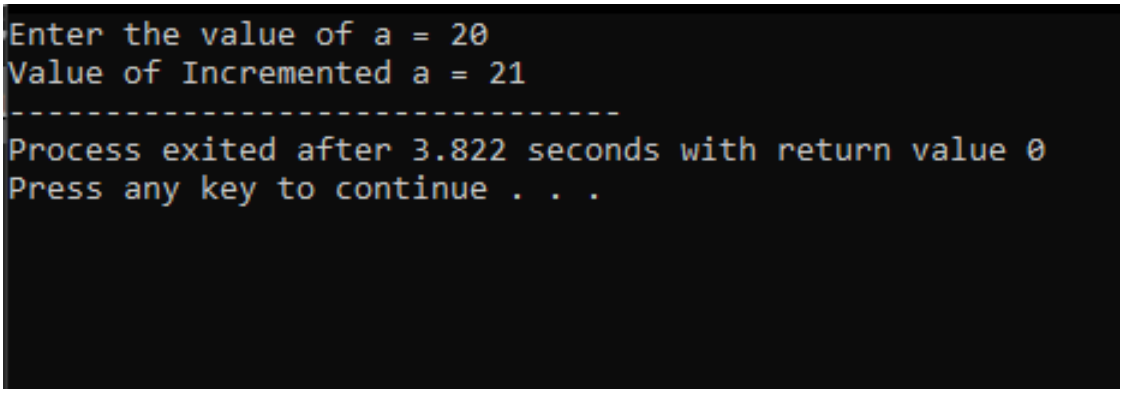

Figure 1: Input and Output

2 Question-2

Write a program that implements the merge sort algorithm for an array of integers using pointers.

2.1 Code

```
#include <stdio.h>

void merge(int *arr, int left, int mid, int right) {
    int i = left, j = mid + 1, k = 0;
    int temp[right - left + 1];

    while (i <= mid && j <= right)
        {
        if (*(arr + i) <= *(arr + j))
            temp[k++] = *(arr + i++);
        else
            temp[k++] = *(arr + j++);
    }

    while (i <= mid)
```

```
    {
        temp[k++] = *(arr + i++);
        }

    while (j <= right)
    {
        temp[k++] = *(arr + j++);
    }

    for (i = left, k = 0; i <= right; i++, k++)
        {
        *(arr + i) = temp[k];
        }
}

void merge_sort(int *arr, int left, int right)
{
    if (left >= right)
        return;

    int mid = (left + right) / 2;
    merge_sort(arr, left, mid);
    merge_sort(arr, mid + 1, right);
    merge(arr, left, mid, right);
}

int main()
{
    int arr[] = {10, 7, 3, 8, 9, 1, 5};

    int n = sizeof(arr) / sizeof(arr[0]);

    printf("value of n = %d\n",n);

    printf("Unsorted array: ");

    for (int i = 0; i < n; i++)
    {
```

```
        printf("%d ", *(arr + i));
        }
    printf("\n");

    merge_sort(arr, 0, n - 1);

    printf("Sorted array: ");
    for (int i = 0; i < n; i++)
    {
        printf("%d ", *(arr + i));
    }
    printf("\n");

    return 0;
}
```

2.2 Inputs and Output

Value of n = 7
Unsorted array: 10 7 3 8 9 1 5
Sorted array: 1 3 5 7 8 9 10[Fig: 2]

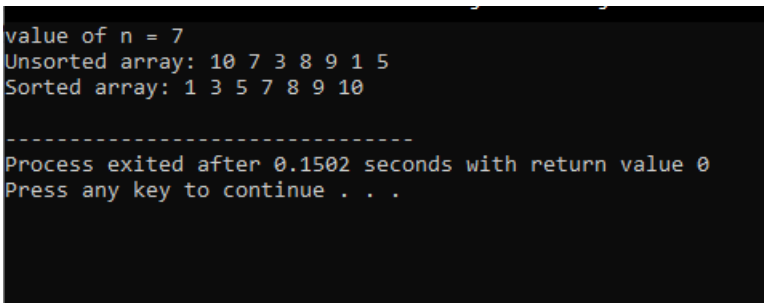

Figure 2: Input and Output