Name – Akshat Jaiswal

Roll No. – 21052646

Section – CSE 37

DSA LAB 2

1. **WAP to find the largest number and count the occurrence of the largest number in a dynamic array of n integers using a single loop.**

Input:

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

int main()
{
    int n;

    printf("Enter no of elements: ");
    scanf("%d", &n);

    int *ptr;
    ptr = (int*)malloc(n * sizeof(int));

    for(int i = 0; i < n; i++)
    {
        printf("Enter element %d : ", (i+1));
        scanf("%d", (ptr+i));
    }

    int max = *ptr, count = 0;

    for (int i = 0; i < n; i++)
    {
       if(*(ptr+i) > max)
```

```c

    int max = *ptr, count = 0;

    for (int i = 0; i < n; i++)
    {
       if(*(ptr+i) > max)
       {
           max = *(ptr+i);
           count = 0;
       }
       if(*(ptr+i) == max)
       {
        count++;
       }
    }
    free(ptr);
    printf("Largest element is %d \n", max);
    printf("Number of times it occured: %d \n", count);
    return 0;
}
```

Output:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.795]
(c) Microsoft Corporation. All rights reserved.

C:\Users\KIIT\Desktop\DSA Classes\LAB 2>.\largest.exe
Enter no of elements: 10
Enter element 1 : 7
Enter element 2 : 9
Enter element 3 : 4
Enter element 4 : 5
Enter element 5 : 6
Enter element 6 : 2
Enter element 7 : 7
Enter element 8 : 9
Enter element 9 : 9
Enter element 10 : 1
Largest element is 9
Number of times it occured: 3

C:\Users\KIIT\Desktop\DSA Classes\LAB 2>
```

2. **Given a dynamic array, WAP to print the next greater element (NGE) for every element. The next greater element for an element x is the first greater element on the right side of x in array. Elements for which no greater element exist, consider next greater element as -1. E.g. For the input array [2, 5, 3, 9, 7], the next greater elements for each elements are as follows.**

   Input:

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

int main()
{
    int n,nge=-1;

    printf("Enter no of elements: ");
    scanf("%d", &n);

    int arr[n];
    int *ptr;
    ptr = (int*)malloc(n * sizeof(int));
     if(ptr==NULL)
    {
        printf("\nMemory not available!");
        exit(1);
    }

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

```
19
20      for(int i = 0; i < n; i++)
21      {
22          printf("Enter element %d : ", (i+1));
23          scanf("%d", &arr[i]);
24      }
25      printf("Element\tNGE\n");
26      for(int i=0;i<n;i++)
27      {
28          nge=-1;
29          for(int j=i+1;j<n;j++)
30          {
31              if(arr[j]>arr[i])
32              {
33                  nge=arr[j];
34                  break;
35              }
36          }
37          printf("%d \t %d\n",arr[i],nge);
38      }
39      return 0;
40  }
```

Output:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.795]
(c) Microsoft Corporation. All rights reserved.

C:\Users\KIIT\Desktop\DSA Classes\LAB 2>.\NGE.exe
Enter no of elements: 5
Enter element 1 : 7
Enter element 2 : 3
Enter element 3 : 8
Enter element 4 : 9
Enter element 5 : 3
Element NGE
7        8
3        8
8        9
9        -1
3        -1

C:\Users\KIIT\Desktop\DSA Classes\LAB 2>
```

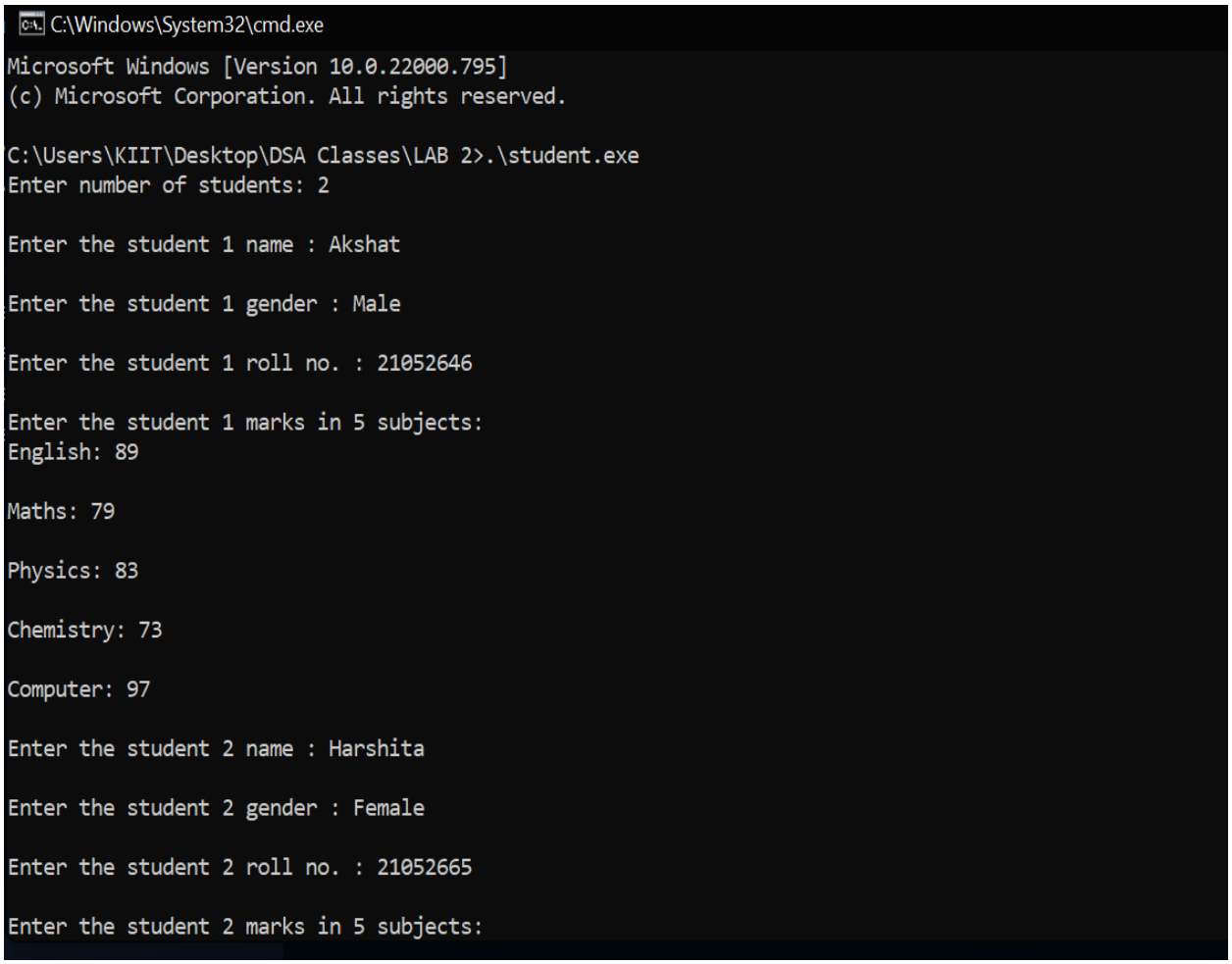
3. **WAP to store n student's information (i.e. student's roll no, name, gender, marks etc) of an educational institute and display all the data, using array of structure.**

Input:

```c
#include <stdio.h>
#include <stdlib.h>
struct student
{
  char name[100];
  char gender[10];
  int eng_marks, math_marks, phy_marks, chem_marks, comp_marks;
  int roll;
};
int main(void)
{
  int n, i;
  float total[100];
  printf("Enter number of students: ");
  scanf("%d", &n);
  struct student stu[n];
  for (i = 0; i < n; i++)
  {
    printf("\nEnter the student %d name : ", i + 1);
    scanf("%s", &stu[i].name);
    fflush(stdin);
    printf("\nEnter the student %d gender : ", i + 1);
    scanf("%s", &stu[i].gender);
    fflush(stdin);
    printf("\nEnter the student %d roll no. : ", i + 1);
    scanf("%d", &stu[i].roll);
    fflush(stdin);
```

```c
    printf("\nEnter the student %d marks in 5 subjects: ", i + 1);
    printf("\nEnglish: ");
    scanf("%d", &stu[i].eng_marks);
    printf("\nMaths: ");
    scanf("%d", &stu[i].math_marks);
    printf("\nPhysics: ");
    scanf("%d", &stu[i].phy_marks);
    printf("\nChemistry: ");
    scanf("%d", &stu[i].chem_marks);
    printf("\nComputer: ");
    scanf("%d", &stu[i].comp_marks);
    total[i] += stu[i].eng_marks + stu[i].math_marks + stu[i].phy_marks + stu[i].chem_marks
    + stu[i].comp_marks;
  }
  printf("\n");
  for (i = 0; i < n; i++){
    printf("\n\nStudent %d details: \n", i + 1);
    printf("\nName: %s\n", stu[i].name);
    printf("\nGender: %s\n", stu[i].gender);
    printf("\nRoll NO.: %d\n", stu[i].roll);
    printf("\n_______Marks_______\n");
    printf("English\tMaths\tPhysics\tChemistry\tComputer\n");
    printf("%d\t%d\t %d\t  %d\t\t%d\n", stu[i].eng_marks, stu[i].math_marks, stu[i].phy_marks,
     stu[i].chem_marks, stu[i].comp_marks);
    printf("\nTotal Marks: %.2f\n", total[i]);
  }
  return 0;
}
```

Output:


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.795]
(c) Microsoft Corporation. All rights reserved.
C:\Users\KIIT\Desktop\DSA Classes\LAB 2>.\student.exe
Enter number of students: 2
Enter the student 1 name : Akshat
Enter the student 1 gender : Male
Enter the student 1 roll no. : 21052646
Enter the student 1 marks in 5 subjects:
English: 89
Maths: 79
Physics: 83
Chemistry: 73
Computer: 97
Enter the student 2 name : Harshita
Enter the student 2 gender : Female
Enter the student 2 roll no. : 21052665
Enter the student 2 marks in 5 subjects:

```
C:\Windows\System32\cmd.exe
English: 85

Maths: 89

Physics: 93

Chemistry: 87

Computer: 91



Student 1 details:

Name: Akshat

Gender: Male

Roll NO.: 21052646

Marks:
English Maths   Physics Chemistry       Computer
89      79       83       73            97

Total Marks: 421.00


Student 2 details:

Name: Harshita

Gender: Female

Roll NO.: 21052665

Marks:
English Maths   Physics Chemistry       Computer
85      89       93       87            91

Total Marks: 445.00
```

4. **WAP to store n employee's data such as employee name, gender, designation, department, basic pay. Calculate the gross pay of each employees as follows:**

Gross pay = basic pay + HR + DA

HR=25% of basic and DA=75% of basic

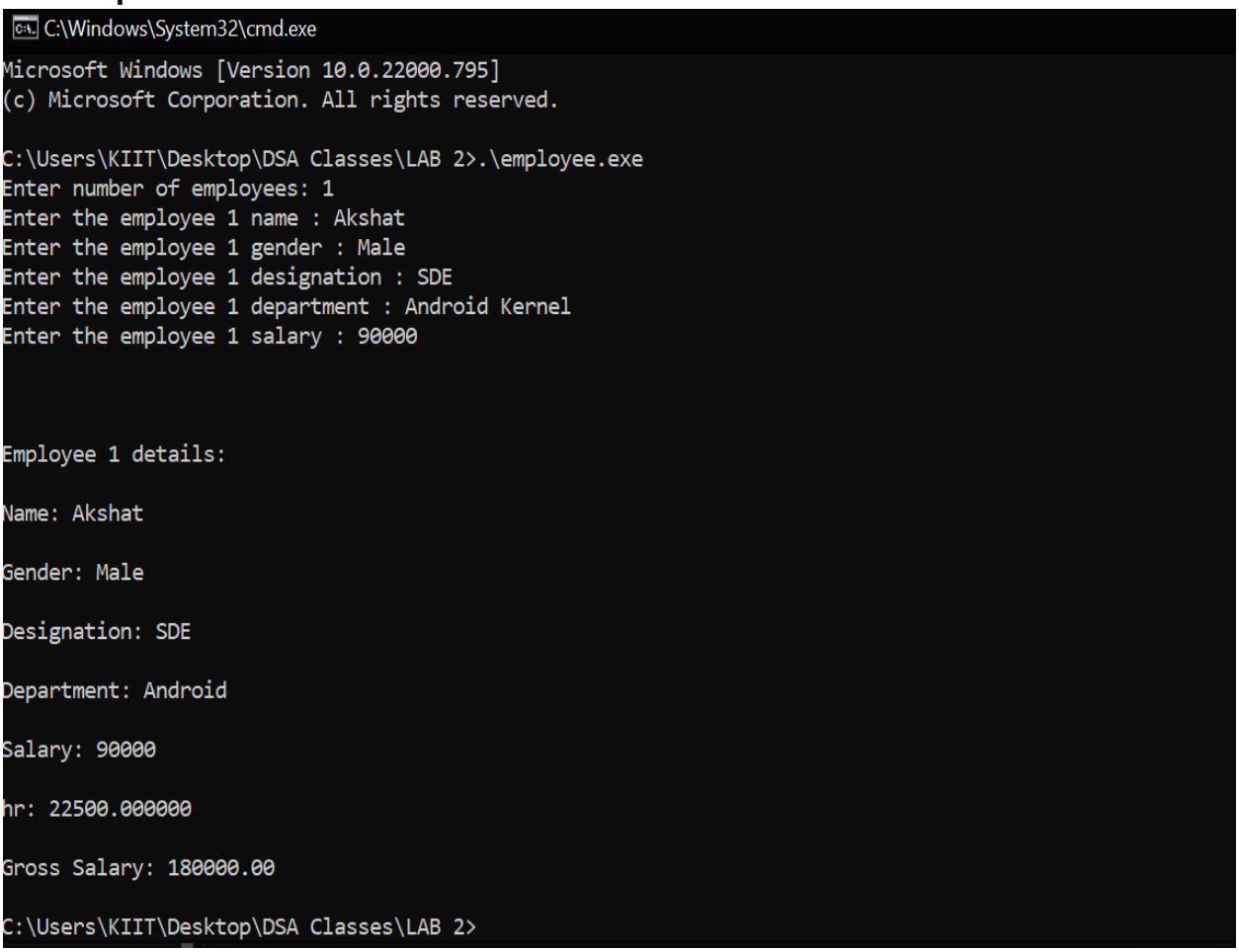
Input:

employee.c > main(void)

```c
#include <stdio.h>
#include <stdlib.h>
struct employee{
    char name[100];
    char gender[100];
    char designation[100];
    char department[100];
    int basic_pay;
};
int main (void)
{
  int n,i;
  float hr[100],da[100];
  printf("Enter number of employees: ");
  scanf("%d",&n);
   int *ptr=(int*) calloc(n,sizeof(int));
    if(ptr==NULL)
    {
        printf("\nMemory not available!");
        exit(1);
    }
    struct employee emp[n];
  for ( i = 0; i < n; i++)
  {
    printf("Enter the employee %d name : ",i+1);
    scanf("%s",&emp[i].name);
    fflush(stdin);
    printf("Enter the employee %d gender : ",i+1);
    scanf("%s",&emp[i].gender);
    fflush(stdin);
```

```c
    printf("Enter the employee %d gender : ",i+1);
    scanf("%s",&emp[i].gender);
    fflush(stdin);
    printf("Enter the employee %d designation : ",i+1);
    scanf("%s",&emp[i].designation);
    fflush(stdin);
    printf("Enter the employee %d department : ",i+1);
    scanf("%s",&emp[i].department);
    fflush(stdin);
    printf("Enter the employee %d salary : ",i+1);
    scanf("%d",&emp[i].basic_pay);
    fflush(stdin);
    hr[i]=(emp[i].basic_pay)*0.25;
    da[i]=emp[i].basic_pay*0.75;
  }
  printf("\n");
for ( i = 0; i < n; i++)
{
    printf("\n\nEmployee %d details: \n",i+1);
    printf("\nName: %s\n",emp[i].name);
    printf("\nGender: %s\n",emp[i].gender);
    printf("\nDesignation: %s\n",emp[i].designation);
    printf("\nDepartment: %s\n",emp[i].department);
    printf("\nSalary: %d\n",emp[i].basic_pay);
    printf("\nhr: %f\n",hr[i]);
    printf("\nGross Salary: %.2f\n",(emp[i].basic_pay+hr[i]+da[i]));
}
return 0;
}
```

Output:


C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.795]
(c) Microsoft Corporation. All rights reserved.
C:\Users\KIIT\Desktop\DSA Classes\LAB 2>.\employee.exe
Enter number of employees: 1
Enter the employee 1 name : Akshat
Enter the employee 1 gender : Male
Enter the employee 1 designation : SDE
Enter the employee 1 department : Android Kernel
Enter the employee 1 salary : 90000
Employee 1 details:
Name: Akshat
Gender: Male
Designation: SDE
Department: Android
Salary: 90000
hr: 22500.000000
Gross Salary: 180000.00
C:\Users\KIIT\Desktop\DSA Classes\LAB 2>

5. **WAP to declare one distance structure (with members kilometer and meter) and create the variables for addition of two distances using Pointers to structure.**

   Input:

distance.c > main()

```c
#include <stdio.h>
struct Distance {
   float kilometer;
   float meter;
} d1, d2, result;

int main() {
   printf("Enter 1st distance\n");
   printf("Kilometer: ");
   scanf("%f", &d1.kilometer);
   fflush(stdin);
   printf("Meter: ");
   scanf("%f", &d1.meter);

   printf("\nEnter 2nd distance\n");
   printf("Kilometer: ");
   scanf("%f", &d2.kilometer);
   fflush(stdin);
   printf("Meter: ");
   scanf("%f", &d2.meter);

   result.kilometer = d1.kilometer + d2.kilometer;
   result.meter = d1.meter + d2.meter;
```

```
21
22      result.kilometer = d1.kilometer + d2.kilometer;
23      result.meter = d1.meter + d2.meter;
24      printf("\nSum of kilometers = %.2f km\n", result.kilometer);
25      printf("\nSum of meters = %.2f m\n", result.meter);
26      result.meter=result.meter/1000;
27
28      if (result.meter >= 1000)
29      {
30          result.meter = result.meter/1000;
31          result.kilometer++;
32      }
33      float sum=result.kilometer + result.meter;
34      printf("\nSum of both the distances in kilometers = %.2f km\n", sum);
35      return 0;
36  }
```

Output:

```
C:\Windows\System32\cmd.exe
Microsoft Windows [Version 10.0.22000.795]
(c) Microsoft Corporation. All rights reserved.

C:\Users\KIIT\Desktop\DSA Classes\LAB 2>.\distance.exe
Enter 1st distance
Kilometer: 5
Meter: 879

Enter 2nd distance
Kilometer: 7
Meter: 354

Sum of kilometers = 12.00 km

Sum of meters = 1233.00 m

Sum of both the distances in kilometers = 13.23 km

C:\Users\KIIT\Desktop\DSA Classes\LAB 2>
```