190905514 **Mohammad Tofik**

WEEK 1 LAB 1 :

1. Write a function Smallest to find the smallest element in an array using pointer. Create a dynamically allocated array and read the values from keyboard in main. Display the result in the main function.

function_program1.h

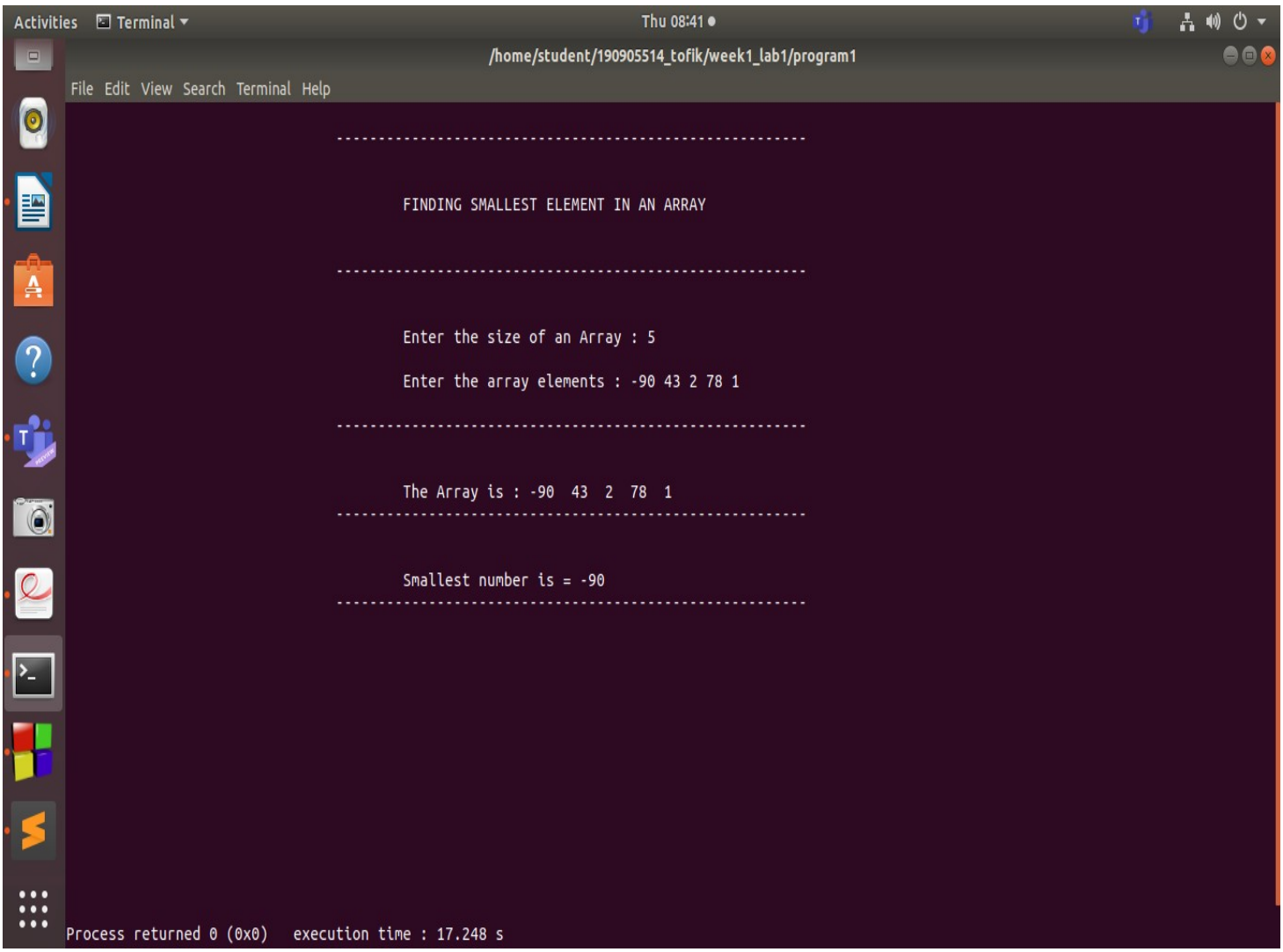
```
int smallestelement(int *array,int n){
	int *p,i;
	p = array;
	int smallest = *p;
	for(i=0;i<n;i++){
		if(*p<smallest)
			smallest = *p;
	}
	return smallest;
}
```

program1.c

```
#include<stdio.h>
#include<stdlib.h>
#include "function_program1.h"

int main(void){
	int n,*array,*p,*last;
	printf("\n\t\t\t\t\t----------------------------------------------------------\n\n");
	printf("\n\t\t\t\t\t\tFINDING SMALLEST ELEMENT IN AN ARRAY\n\n");
	printf("\n\t\t\t\t\t----------------------------------------------------------\n\n");
	printf("\n\t\t\t\t\t\tEnter the size of an Array : ");
	scanf("%d",&n);
	array = (int*)calloc(n,sizeof(int));
	p=array;
	last = array+n;
	printf("\n\t\t\t\t\t\tEnter the array elements : ");
	for(;p<last;p++)
		scanf("%d",p);
	printf("\n\t\t\t\t\t----------------------------------------------------------\n\n");
	printf("\n\t\t\t\t\t\tThe Array is : ");
	for(p=array;p<last;p++)
		printf("%d  ",*p);
	printf("\n\t\t\t\t\t----------------------------------------------------------\n\n");
	printf("\n\t\t\t\t\t\tSmallest number is = %d",smallestelement(array,n));
	printf("\n\t\t\t\t\t----------------------------------------------------------\n\n\n\n\n\n\n\n\n\n\n\n\n\n");

}
```



2. Implement a C program to read, display and to find the product of two matrices using functions with suitable parameters. Note that the matrices should be created using dynamic memory allocation functions and the elements are accessed using array dereferencing.

function_product_matrix.h

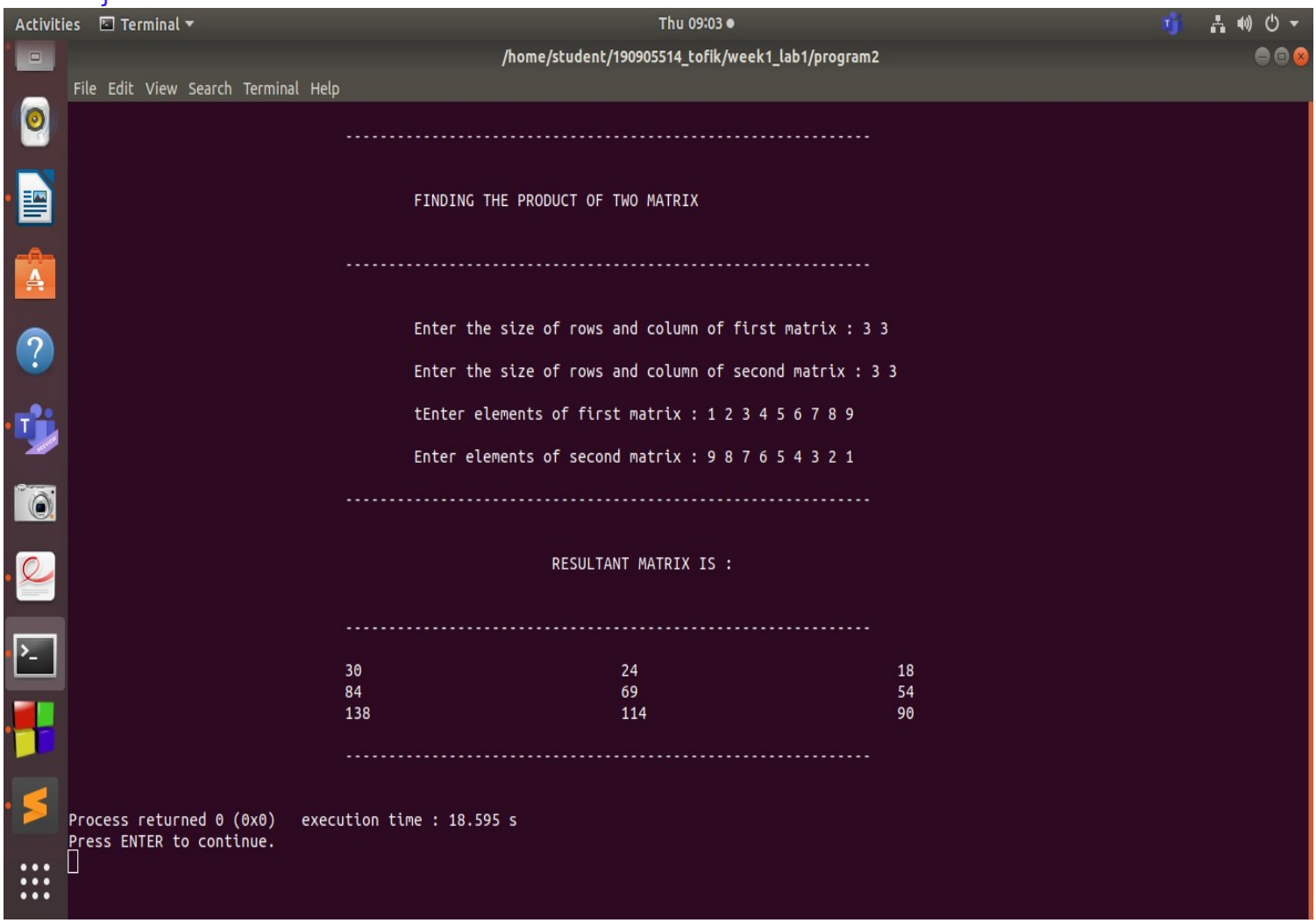
```
void productmatrix(int ** a, int ** b, int ** array, int r1, int c1, int r2, int c2){
	for(int i = 0; i < r1; i++){
		for(int j = 0; j < c2; j++){
			for(int k = 0; k < c1; k++){
				array[i][j] += a[i][k] * b[k][j];
			}
		}
	}
}
```

program2.c

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

```
int main(void){
	int r1, c1, r2, c2;
	printf("\n\t\t\t\t----------------------------------------------------------------\n\n");
	printf("\n\t\t\t\t\tFINDING THE PRODUCT OF TWO MATRIX\n\n");
	printf("\n\t\t\t\t----------------------------------------------------------------\n\n");
	printf("\n\t\t\t\t\tEnter the size of rows and column of first matrix : ");
	scanf("%d %d", &r1, &c1);
	printf("\n\t\t\t\t\tEnter the size of rows and column of second matrix : ");
	scanf("%d %d", &r2, &c2);
	if(c1 != r2){
		printf("\n\t\t\tInvalid operation ! ");
		return 0;
	}
	int ** a = (int **)calloc(r1+1, sizeof(int *));
	int ** b = (int **)calloc(r2+1, sizeof(int *));
	printf("\n\t\t\t\t\ttEnter elements of first matrix : ");
	for(int i = 0; i < r1; i++){
		// table[i] = (int *) calloc(colNum+1, sizeof(int));
		a[i] = (int *) calloc(c1+1, sizeof(int));
		for(int j = 0; j < c1; j++){
			scanf("%d", &a[i][j]);
		}
	}
	printf("\n\t\t\t\t\tEnter elements of second matrix : ");
	for(int i = 0; i < r2; i++){
		// table[i] = (int *) calloc(colNum+1, sizeof(int));
		b[i] = (int *) calloc(c2+1, sizeof(int));
		for(int j = 0; j < c2; j++){
			scanf("%d", &b[i][j]);
		}
	}
	int ** array = (int **)calloc(r1+1, sizeof(int *));
	for(int i = 0; i < r1; i++){
		array[i] = (int *) calloc(c2+1, sizeof(int));
		for(int j = 0; j < c2; j++){
			array[i][j] = 0;
		}
	}
	productmatrix(a, b, array, r1, c1, r2, c2);
	printf("\n\t\t\t\t----------------------------------------------------------------\n\n");
	printf("\n\t\t\t\t\t\tRESULTANT MATRIX IS : \n\n");
	printf("\n\t\t\t\t----------------------------------------------------------------\n\n");
	for(int i = 0; i < r1; i++){
		for(int j = 0; j < c1; j++){
			printf("\t\t\t%d ", array[i][j]);
		}
	printf("\n");
	}
	printf("\n\t\t\t\t----------------------------------------------------------------\n\n");
	for(int i = 0; i < r1; i++){
		free(a[i]);
	}
	free(a);
	for(int i = 0; i < r2; i++){
		free(b[i]);
	}
	free(b);
	for(int i = 0; i < r1; i++){
		free(array[i]);
	}
	free(array);
```

```
}
```



3. Samuel wants to store the data of his employees, which includes the following fields:
(i) Name of the employee (ii) Date of birth which is a collection of {day, month, year}
(iii) Address which is a collection of {house number, zip code and state}.
Write a 'C'program to read and display the data of N employees using pointers to array of structures.

Program3.c

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

struct DOB
{
   int day, month, year;
};

struct ADRS
{
   int house_no;
   long zipcode;
   char state[20];
```

```
};

struct EMPLOYEE
{
   char name[20];
   struct DOB dob;
   struct ADRS address;
};

struct EMPLOYEE emp[10];
struct EMPLOYEE* ptr = emp;

int main()
{
   int n;
   printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
   printf("\n\t\t\t\t\tDATA OF EMPLOYEE \n\n");
   printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
   printf("\n\t\t\t\t\tEnter the no Of Employees: ");
   scanf("%d",&n);
   for(int i=0; i<n; i++)
   {
      printf("\n\t\t\t\t\t Enter The Details Of Employee : %d ",i+1);
      printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
      printf("\n\t\t\t\t\tEnter the Name of Employee : ");
      scanf("%s",(emp+i)->name);
      printf("\n\t\t\t\t\tEnter Date of Birth : ");
      printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
      printf("\n\t\t\t\t\tEnter the Date : ");
      scanf("%d",&(emp+i)->dob.day);
      printf("\n\t\t\t\t\tEnter the Month : ");
      scanf("%d",&(emp+i)->dob.month);
      printf("\n\t\t\t\t\tEnter the Year : ");
      scanf("%d",&(emp+i)->dob.year);
       printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
      printf("\n\t\t\t\t\tEnter the address of employee : ");
       printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
      printf("\n\t\t\t\t\t Enter the House Number : ");
      scanf("%d",&(emp+i)->address.house_no);
      printf("\n\t\t\t\t\tEnter the Zip Code : ");
      scanf("%ld",&(emp+i)->address.zipcode);
      printf("\n\t\t\t\t\tEnter the State : ");
      scanf("%s",(emp+i)->address.state);
      printf("\n\n");
   }
   printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
   printf("\n\t\t\t\t\tThe Details of all the employees : \n\n");
   for(int i=0; i<n; i++)
   {
      printf("\n\t\t\t\t\tEMPLOYEE  : %d",i+1);
      printf("\n\t\t\t\t\tName is : %s",((emp+i)->name));
      printf("\n\t\t\t\t\tDOB is : %d  %d  %d",((emp+i)->dob.day),((emp+i)->dob.month),
((emp+i)->dob.year));
      printf("\n\t\t\t\t\tAddress is: %d  %ld  %s ",((emp+i)->address.house_no),((emp+i)-
>address.zipcode),((emp+i)->address.state));
      printf("\n");
   }
    printf("\n\t\t\t----------------------------------------------------------------------------------\n\n");
}
```

```
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--------------------------------------------------------------------------------

                DATA OF EMPLOYEE

--------------------------------------------------------------------------------

                Enter the no Of Employees: 2
                 Enter The Details Of Employee : 1
--------------------------------------------------------------------------------

                Enter the Name of Employee : rizwan
                Enter Date of Birth :
--------------------------------------------------------------------------------

                Enter the Date : 25
                Enter the Month : 5
                Enter the Year : 2000
--------------------------------------------------------------------------------

                Enter the address of employee :
--------------------------------------------------------------------------------

                 Enter the House Number : 45
                Enter the Zip Code : 200014
                Enter the State : lucknow
```

```
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                 Enter The Details Of Employee : 2
--------------------------------------------------------------------------------

                Enter the Name of Employee : rakesh
                Enter Date of Birth :
--------------------------------------------------------------------------------

                Enter the Date : 3
                Enter the Month : 8
                Enter the Year : 1999
--------------------------------------------------------------------------------

                Enter the address of employee :
--------------------------------------------------------------------------------

                 Enter the House Number : 3
                Enter the Zip Code : 25471
                Enter the State : karnataka


--------------------------------------------------------------------------------

                The Details of all the employees :

                EMPLOYEE  : 1
```

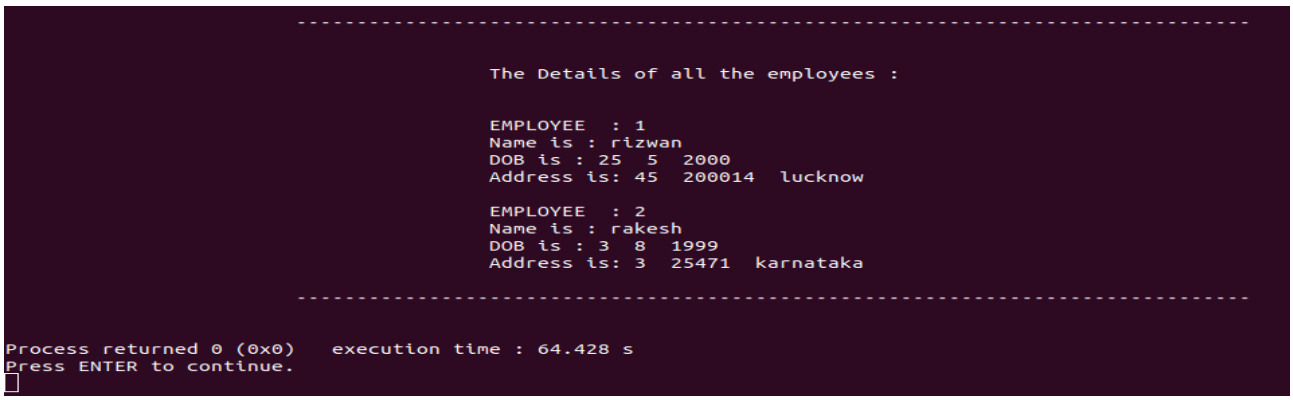
The Details of all the employees :
EMPLOYEE : 1
Name is : rizwan
DOB is : 25 5 2000
Address is: 45 200014 lucknow
EMPLOYEE : 2
Name is : rakesh
DOB is : 3 8 1999
Address is: 3 25471 karnataka
Process returned 0 (0x0) execution time : 64.428 s
Press ENTER to continue.