Structured Programming Language (CSE-1111)

Assignment -2

1. Suppose we want to hire few employees for an uprising software company through online registration and aptitude test selecting from 50 candidates. To register, a candidate will provide the information mentioned in (i) below. When a candidate log on, his/her total marks will be shown on the screen. Now, write a C program considering the above scenario and the following information:
   (i) Design a structure of candidate which contains Name, Email, Password, and Test Marks. You should declare appropriate data type for each variable. Initialize the members with default values with your own name, email, and other appropriate information.
   (ii) Take input for all the candidates in an array of candidates from keyboard. Array size = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID.
   (iii) As part of the login process, use a login() function. In the function, take an email and a password from user as credential. Find the candidate using these credentials from the array of candidates. If any match is found, display the total marks of that candidate. If not found, display "Wrong Email and/or Password".
   (iv) Call the login() function from the main function.

2. Write a program that performs the following operations.
   (a) Use a user-defined function "search" that takes four parameters: (i) an array of float values, (ii) a value to search, (iii) an int value n - number of values in the array, and (iv) an int number r.
   The "search" function finds the r^{th} occurrence of that value in the array. If found, returns the index. If not found, returns -1.
   (b) In the main function: i) Call the function "search" passing an array, a value to search, and an int a, where a = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID % 10. ii) If found, display the value and the index. If not found, display "Not Found". (iii) Do all the necessary declarations, initialization, and input of variables as required.
   (c) Add appropriate prototypes of the function.
3. Write a program as part of the UCAM application that will store the Fall 2021 SPL final exam scores of sections A, B, C, D, E, and F using a 2-D array. The maximum capacity for any section is 45 students. In your program, initialize all the array values with (LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID % 11 + 10) values. Increment all the scores of section C by i^{10}, where i is the index of the score.
4. Show manual tracing of str1 and str2 of the following code segment and find output.

```
char str1[100] = "Hello";
char str2[100] = "Bonjour";
int i, k;
strncat(str1, "Maria", 2);
strncpy(str2, "Federick", 3);
i=strlen(str1);
for(k=0; str2[k] !='\0'; k++)
    str1[i+k] = str2[k];
str1[i + k] = '\0';
puts(str2);
printf("\n");
puts(str1);
printf("\n");
strrev(str1);
puts(str1);
```

5. Write a program that reads the following “Sample.txt” file that has integer numbers on separate lines and computes the average of the numbers.

Sample.txt

```
4
7
11
…
…
13
15
```

6. Write the output of the following code segment. The ASCII code of ‘A’ is 65 and ‘a’ is 97.

```
#include<stdio.h>
void function(char str[], int code, int n);
void main() {
        char name[50] = "Abu Sayeed Shiblu";
        function(name, 'A', 0);
}
void function(char str[], int code, int n) {
        printf("%c, ", code);
        int num = code % strlen(str);
        if (n > 4) return;
        function(str, str[num], ++n);
}
```

7. Find out the GCD of two numbers using recursion.
8. In which order the following functions will be called? What will be the output of the following program?

```
#include <stdio.h>

int func_x(int z){
    return z*5;
}

int func_z(int x){
    int y = func_x(x+1);
    return y;
}

int func_id(int id){
    id = func_z(id);
    return id;
}

void print(){

   printf("_____\n");
}

int main(){
    print();
    int c = func_id(100);
    printf("c = %d\n",c);

    return 0;
}
```

9. Write the final content of the test.txt file

```
#include<stdio.h>
void main(){
        FILE *file;
        int i, j, sum, a = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID;
        int num[] = {a, a+1, a+2, a+3, a+4, a+5, a+6, a+7, a+8, a+9};
        file= fopen("test.txt", "w");
        fprintf(file, "%s\n", “Hello 3 dosers!!!”);
        for(i=4; i<=7; i++){
                fprintf(file, "Line %d: ", i);
                for(j=9; j>=0; j--){
                        if((i+j)%4==0)
                                fprintf(file, "%d, ", num[j]);
                }
                fprintf(file, "\n", num[i]);
        }
        fclose(file);
}
```

10. What is the output of the following code?

```
#include<stdio.h>
int main(){
   int b = LAST_FOUR_DIGIT_OF_YOUR_STUDENT_ID % 11;
   int a[5] = {b+1, b+2, b+3, b+4, b+5};
   int *p1,t,u,v,w;

   p1=a;
   t = (*p1)++;
   u = *p1;
   v = *++p1;
   w = *(++p1);

   printf("%d %d %d %d", t, u, v, w);
}
```

11. In the manual tracing, show the value of variables num1 and num2 every time their values change starting from initial value.

```
int num1, num2;
int f1(float x);
void f2(int x, float y);
int main(){
 num1 = LAST_FOUR_DIGITS_OF_YOUR_STUDENT_ID % 7;
 num2 = f1(num1);
 f2(12, 15.0);
 return 0;
}
int f1(float x) {
 num2 = x*num1;
 return num2-1;
}
void f2(int num1, float num2){
 num1 = num1+num2;
 num2 = num1-num2;
}
```

12. Write a program where you take a sentence from keyboard and count the number of letters that are in upper case without using indices. If count is odd, display your own name. If count is even display your own student id.

13. Write a program that takes a sentence from keyboard, makes the sentence camel/title casing (first letter of all words capital), appends your id to the sentence as the last word, and finally display the sentence.
    For example, if your id is “011202017”
    Input = “It is a nice sunny morning today”
    Output: “It Is A Nice Sunny Morning Today 011202017”