C Programming Basics (Laboratory Session 9)

SSC 322/392

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Exercise 1

- Fibonacci numbers are the numbers in the following integer sequence:

  0 ,1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, …
- By definition, the first two numbers in the Fibonacci sequence are 0 and 1, and each subsequent number is the sum of the previous two
- Write a program that prompts for the length of the Fibonacci sequence and prints the sequence of desired length on the screen
- For example, if the specified length of the sequence is 5, then following should be printed on the screen:

  0 ,1, 1, 2, 3

Solution to Exercise 1 (1)

```
1. #include <stdio.h>
2. int fibonacci();
3. int main(){
4.  int n, i;
5.  printf("\nHow many Fibonacci numbers do you want to see?\n");
6.  scanf("%d",&n);
7.  printf("The first %d Fibonacci numbers are:\n", n);
8.  for(i=0; i<n; i++){
9.    if ((i==0 || i ==1) && n > 0){
10.     printf("%d ", i);
11.   }else{
12.         printf("%d ", fibonacci());
13.   }
14. }
15. return 0;
16.}
```

Solution to Exercise 1 (2)

```
17. int fibonacci(){
18.   static int f1=0, f2=1;
19.   int f;
20.   f = f1 + f2;
21.   f1 = f2;
22.   f2 = f;
23.   return f;
24. }
```

Exercise 2

- Write a program to add two vectors of length `N` (1 dimensional arrays of length `N`). The addition of the vectors should be handled through a user-defined function
  - You will declare two 1-dimesnional arrays or vectors of data type integer in your `main` function
  - You can assume the length of the vector (`N`) to be 4

    ```
    int A[4], B[4];
    ```

  - You will initialize the values of the vectors in the function `main`
  - You will declare a function named `addVectors` that does not return anything but accepts two vectors of length N as input values

    ```
    void addVectors(int *A, int *B, N);
    ```

  - Print the sum of the two vectors by calling the `addVectors` function from the `main` function
    - You can either declare a third vector C to store the sum of the two given vectors and then print the vector C or you can directly print the sum of the two given vectors without storing their values in a third vector