Final Assessment

Fall Semester 2024

BBA Program

Course title : Structured Programming language
Course Code : CSE-211
Student Name : MD TUSHAR AHAMED
student id : 1113300361

Answer to the question no:1(a)

Function: A function is defined as a relation between a set of inputs having one output each. In simple words, a function is a relationship between inputs where each input is related to exactly one output.

Syntax for C-Function: The syntax for a C function is return type function name (Parameter type parameter name, parameter type parameter name.....)

Answer to the question no: 1(b)

C-program to calculate average for the given three numbers:

```
1. #include <Stdio.h>
2.
3. int main (){
4. Float num1, num2, num3, Sum, average;
5.
6. // Input three numbers
7. Printf ("Enter three numbers:");
8. Scanf ("%f %f %f", &num1, &num2, &num3);
9.
10. // Calulate sum
11. Sum = num1 + num2 + num3;
12.
13. // Calculate average.
```

```
14. Average = Sum / 3;
15.
16. // Output the results.
17. Printf ("Sum: %f \n", Sum)
18. Printf ("Average: %f \n", average);
19.
20. return 0;
21. }
```

Answer to the question no: 1(c)

The advantages of using function: Some of the advantages of using functions are:

a) Enables reusability and reduces redundancy.

b) Makes a code modular.

c) Provides abstraction functionality.

d) The program becomes easy to understand and manage.

e) Breaks as extensive program into smaller and simpler pieces.

Answer to the question no: 2(a)

Array: An array is an indexed collection of data elements of the same type. 1) Indexed means that the array elements are numbered (starting at 0). 2) The restriction of the same type is an important one, because arrays are stored in consecutive memory cells.

For example, if you want to store 100 integers, you can create an array for it `int data[100];`

Answer to the question no:2 (b)

Statement of program: This program accepts the Marks obtained by 30 students of a class in a Test and computer the Average Marks:

```
# include <Stdio h>
# include <conio h>
void main()
int i
int Avg
int maks [40];                    /*Array Declaration*/
Clrscr()
Sum = 0
for (i = 0; <= 29; i++)
{
Printf ("Enter Marks/n");
Scanf ("%d", & marks [i];         /* Store Data in Array
```

```
}
for (i=0; <=29; i++)
{
Sum = Sum+ marks [i]; /*Read Data from an Array*/
Avg = Sum / 30;
Print (" Average Marks = % d/n ", Avg);

                                    /* End of main()*/
```

Output

Enter Marks

2

4

6

8

10

12

14

16

18

20

22

24

26

28

30

32

34

36

38

40

41

44

46

48

50

52

54

56

58

60

Average Marks = 31

Answer to the question no : 2(e)

The advantages of using array: The main advantages of using an array is its ability to efficiently access elements directly using their index, making it ideal for storing and retrieving ordered data quickly, especially when the data size is known in advance; this is due to the contiguous memory allocation which minimizes memory overhead and improves performance.

key benefits of using arrays:

Fast Access:

Memory Efficiency:

Ordered Collection:

Simplicity:

Suitable for Algorithms:

Data Cohesion:

Answer to the question no: 4(a)

AC- program to test a year is "Leap Year" or "Not":

```
1. # include <stdio.h> // Include the standard input/output header file.
2.
3. Void main ()
4. {
5. int chk year; // Declare an integer variable 'chk year'.
6.
7. Printf ("Input a year:") // Prompt the user to input a year.
8. Scanf ("%d", &chkyear); // Read and store the user's input in 'chk year'
9. if ((chk year % 400) = 0) // Check if 'chk year' is divisible by 400 with no remainder.
```

10. Printf ("%d is a leap year.\n", chk year);
// Printf a message indication that 'chk year' is a leap year.

11. else if ((chk year % 100) == 0) // check if 'chk year' is divisible by 100 with no remainder.

12. Printf ("%d is not a leap year\n", chk year);
// print a message indicating that 'chk year' is not a leap year.

13. else if ((chk year % 4) == 0) // check if 'chk year' is divisible by 4 with no remainder.

14. Printf ("%d is a leap year \n", chk year);
// print a message indicating that 'chk year' is a leap year.

15. else

16. Printf ("%d is not a leap year \n", chk year);
// Print a message indication that 'chk year'

is a leap year.

17. }

Sample Output:

Input a year : 2016

2016 is a leap year.

Answer to the question no 4(b)

C program to calculate LCM for two positive integers:

```
#Include <Stdio.h>
int main() {
int n1, n2, max, lcm;
Printf ("Enter two positive integers: ");
Scanf ("%d %d", &n1, &n2);
// max1mum number between n1 and n2 1s
Stored 1n max
max = (n1 > n2)? n1; n2;
1cm = max;
while. ((1cm % n1 = 0 || (1cm% n2 !. =0)) {
1cm += max;
}
Printf (" The 1CM of %d and 1s %d .", n1, n2, 1cm)
return 0;
}
```

Output

Enter two positive integers : 72

120

The LCM of 72 and 120 is 360.

Answer to the question no: 5 (a)

Recursion: Recursion is the process of defining of defining a problem (or the solution to a problem) in terms of (a simpler version of) itself. A function that calls itself is called as recursive function and this technique is called as recursion.

Syntax Example (Calculating Factorial in python):

```
def factorial(n):
 if n ==0:
return 1 # Base case
else:
return n*factorial (n-1) # Recursive call
```

Advantages:

1. Reduce unnecessary calling of function.
2. Through recursion one can solve problems

in easy way while its iterative solution at its very big and complex.

3. Extremely useful when applying the same solution.

Answer to the question no: 5(b)

C program to find sum of series $1+2+3+\ldots+n$ using recursion

```
#include <stdio.h>
// recursive function to calculate sum
// of series 1+2+3....+n
int calculate sum(int n){
// exit condition of recursive call
if (n =0)
return 0;
// Call function
return n+Calculate sum (n-1);
}
```

```
int main(){
// delelare variables
int n, sum;
// take input of n
Printf ("Enter no of terms:");
Scanf ("%d", &n);
// Call function to get result
Sum = calculate sum(n);
// display result
 Printf ("Sum: %d \n", sum);
  return 0;
}
```

Output

Enter no of terms: 20

Sum 210