

Assignment -4

Name - Indranil Bain
Enrollment N.o - 2020CSB039
Group - 4
Subject - Computer Laboratory

1. A positive integer is entered through the keyboard. Write a function to print the prime factors of this number.

Ans.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question1.c > prime(int)
1  #include <stdio.h>
2  int prime(int x);
3  int main()
4  {
5
6      char choice = 'y';
7      while (choice != 'n')
8      {
9          int num;
10         printf("Enter an integer: ");
11         scanf("%d", &num);
12         prime(num);
13         printf("\nDo you wanna do this again ? (y/n) ");
14         getchar();
15         choice = getchar();
16     }
17 }
18
19 int prime(int x)
20 {
21     int a;
22     printf("The prime factors of the given number are = ");
23
24     for (a = 2; a <= x; a++)
25     {
26         if (x % a == 0)
27         {
28             printf("%d, ", a);
29             x = x / a;
30             a--;
31         }
32     }
33 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/" && gcc quention1.c -o quention1 &&
indranilbain@Indranils-MacBook-Air ~ % cd "/Users/indranilbain/Projects/vs code/C code Assignment
7/"quention1
question1.c:33:1: warning: non-void function does not return a value [-Wreturn-type]
}
^
1 warning generated.
Enter an integer: 3
The prime factors of the given number are = 3,
Do you wanna do this again ? (y/n) y
Enter an integer: 6
The prime factors of the given number are = 2, 3,
Do you wanna do this again ? (y/n) ☐
```

2. Write a function in C that will find the factorial of a given number.

Ans.

Users > indranilbain > Projects > vs code > C code Assignment 7 > question2.c > main()

```
1  #include <stdio.h>
2  long factorial(int n)
3
4  {
5
6      int i, prod = 1;
7      for (i = 1; i < n; i++)
8          prod = i;
9      return prod;
10 }
11 int main ()
12 {
13     char choice = 'y';
14     while (choice != 'n')
15     {
16         int number;
17         long fact;
18         printf("Enter a number: ");
19         scanf("%d", &number);
20         fact = factorial(number);
21         printf("Factorial of %d is %ld\n", number, fact);
22         printf("Do you wanna do this again ? (y/n) : ");
23         getchar();
24         choice = getchar();
25     }
26 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
indranilbain@Indranils-MacBook-Air C code Assignment 7 % cd "/Users/indranilbain/Projects/vs code/C code
C code Assignment 7/"question2
question2.c:21:52: warning: format specifies type 'int' but the argument has type 'long' [-Wformat]
    printf("Factorial of %d is %ld\n", number, fact);
                                   ~~~~
                                   %lld
1 warning generated.
Enter a number: 5
Factorial of 5 is 4
Do you wanna do this again ? (y/n) : n
indranilbain@Indranils-MacBook-Air C code Assignment 7 %
```

3. Write a function in C that will find the GCD of two numbers.

Ans.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question3.c > GCD(int, int)
1  #include <stdio.h>
2  int GCD(int a, int b);
3  int main()
4  {
5      char choice = 'y';
6      while (choice != 'n')
7      {
8          int A, B, gcd;
9          printf("Enter two numbers : ");
10         scanf("%d %d", &A, &B);
11         gcd = GCD(A, B);
12         printf("The GCD of %d and %d is %d ", A, B, gcd);
13         printf("\n Do you wanna do this again ? (y/n);");
14         getchar();
15         choice = getchar();
16     }
17 }
18
19 int GCD(int a, int b)
20 {
21     int gcd;
22     int i;
23     for (i = 1; i <= a && i <= b; i++)
24     {
25         if ((a % i == 0) && (b % i == 0))
26             gcd = i;
27     }
28     return gcd;
29 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
indranilbain@Indranils-MacBook-Air C code Assignment 7 % cd "/Users/indranilbain/Projects/vs co
C code Assignment 7/"question3
Enter two numbers : 23
34
The GCD of 23 and 34 is 17
Do you wanna do this again ? (y/n);y
Enter two numbers : 12
98
The GCD of 12 and 98 is 7
Do you wanna do this again ? (y/n);
```

4. Write a function in C that will accept the number of lines to be printed for the Pascal Triangle and print it on the screen.

Ans.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question4.c > pascal(int)
1  #include <stdio.h>
2  int pascal(int rows);
3  int main()
4  {
5      char choice = 'y';
6      while (choice != 'n')
7      {
8          int n;
9          printf("Enter the number of rows : ");
10         scanf("%d", &n);
11         printf("The required Pascal's Triangle is : \n");
12         pascal(n);
13         printf("Do you wanna do this again ? (y/n) : ");
14         getchar();
15         choice = getchar();
16     }
17 }
18 int pascal(int rows)
19 {
20     int coef = 1, space, i, j;
21     for (i = 0; i < rows; i++)
22     {
23         for (j = 0; j <= i; j++)
24         {
25             if (j == 0 || i == 0)
26                 coef = 1;
27             else
28                 coef = coef * (i - j + 1) / j;
29             printf("%4d", coef);
30         }
31         printf("\n");
32     }
33 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/" && gcc question4.c -o qu
indranilbain@Indranils-MacBook-Air ~ % cd "/Users/indranilbain/Projects/vs code/C code
7/"question4
```

```
question4.c:33:1: warning: non-void function does not return a value [-Wreturn-type]
}
```

```
1 warning generated.
```

```
Enter the number of rows : 6
```

```
The required Pascal's Triangle is :
```

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
1 5 10 10 5 1
```

```
Do you wanna do this again ? (y/n) : █
```

5. Write a function in C that will swap the contents of two variables. Call the function from main and print the new values of these variables from main.

Ans.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question5.c > swap(int, int)
1  #include <stdio.h>
2  void swap(int a, int b);
3  int main()
4  {
5      char choice = 'y';
6      while (choice != 'n')
7      {
8          int m, n, ex[2] = {}, i;
9          printf("Enter the values to be swapped: ");
10         scanf("%d %d", &m, &n);
11         swap(m, n);
12         printf("\nDo you wanna do this again ? (y/n) ");
13         getchar();
14         choice = getchar();
15     }
16 }
17 void swap(int a, int b)
18 {
19     int temp;
20     temp = a;
21     a = b;
22     b = temp;
23 }
24 printf("The swapped values are %d and %d", a, b);
25 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/" && gcc question5.c -o question5 && "/U
indranilbain@Indranils-MacBook-Air ~ % cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/"
7/"question5
Enter the values to be swapped: 56
98
The swapped values are 98 and 56
Do you wanna do this again ? (y/n) y
Enter the values to be swapped: 34
54
The swapped values are 54 and 34
Do you wanna do this again ? (y/n) ☐
```

6. Write a recursive function in C to print the first n terms of the Fibonacci sequence.

Ans.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question6.c > main()
1  #include <stdio.h>
2  int Fibonacci(int n);
3  int main()
4  {
5      char choice = 'y' ;
6      while (choice != 'n')
7      {
8          int n, i = 0, c;
9          printf("Enter the number of terms : ");
10         scanf("%d", &n);
11         printf("Fibonacci series\n") ;
12         for (c = 1; c <= n; c++)
13         {
14             printf("%d\n", Fibonacci(i));
15             i ++;
16         }
17         printf("Do you wanna do this again ? (y/n) : ");
18         getchar();
19         choice = getchar();
20     }
21 }
22 int Fibonacci(int n)
23 {
24     if (n == 0)
25         return 0;
26     else if (n == 1)
27         return 1;
28     else
29         return (Fibonacci(n - 1) + Fibonacci(n - 2));
30 }

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indranilbain@Indranils-MacBook-Air C code Assignment 7 % cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/"question6
Enter the number of terms : 8
Fibonacci series
0
1
1
2
3
5
8
13
Do you wanna do this again ? (y/n) : █
```

7. Write a recursive function in C to find the factorial of a given number.

Ans.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question7.c > main()
1  #include <stdio.h>
2  int fact(int n);
3  int main()
4  {
5
6      char choice = 'y';
7      while (choice != 'n')
8      {
9          int m;
10         printf("Enter the number for facorial calculation: ");
11         scanf("%d", &m);
12         printf("The factorial of %d is %d", m, fact(m));
13         printf("\nDo you wanna do this again ? (y/n) : ");
14         getchar();
15         choice = getchar();
16     }
17 }
18
19 int fact(int n)
20 {
21     while (n != 0)
22         return n * fact(n - 1);
23     return 1;
24 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/" && gcc question7.c -o question7 && "
indranilbain@Indranils-MacBook-Air ~ % cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/"question7
Enter the number for facorial calculation: 9
The factorial of 9 is 362880
Do you wanna do this again ? (y/n) : y
Enter the number for facorial calculation: 15
The factorial of 15 is 2004310016
Do you wanna do this again ? (y/n) : █
```

8. Write a recursive function in C to find the sum of the digits of a non-negative integer number.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question8.c > sum_of_digit(int)
1  #include <stdio.h>
2  int sum_of_digit(int n)
3  {
4      if (n == 0)
5          return 0;
6      return (n % 10 + sum_of_digit(n / 10));
7  }
8
9      int main()
10     {
11         char choice = 'y';
12         while (choice != 'n')
13         {
14             int num;
15             printf("Enter the number : ");
16             scanf("%d", &num);
17             int result = sum_of_digit(num);
18             printf("Sum of digits in %d is %d\n", num, result);
19             printf("Do you wanna do this again ? (y/n)");
20             getchar();
21             choice = getchar();
22         }
23     }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/" && gcc question8.c -o question8 &&
indranilbain@Indranils-MacBook-Air ~ % cd "/Users/indranilbain/Projects/vs code/C code Assignment
7/"question8
Enter the number : 7865
Sum of digits in 7865 is 26
Do you wanna do this again ? (y/n)y
Enter the number : 6547
Sum of digits in 6547 is 22
Do you wanna do this again ? (y/n)
```


9. Write a recursive function in C to find the GCD of two input numbers.

Ans.

Users > indranilbain > Projects > vs code > C code Assignment 7 > question9.c > main()

```
1  #include <stdio.h>
2  int hcf(int n1, int n2);
3  int main()
4  {
5
6      char choice = 'y';
7      while (choice != 'n')
8      {
9          int n1, n2;
10         printf("Enter two positive integers: ");
11         scanf("%d %d", &n1, &n2);
12         printf("G.C.D of %d and %d is %d.", n1, n2, hcf(n1, n2));
13         printf("\nDo you wanna do this again (y/n) : ");
14         getchar();
15         choice = getchar();
16     }
17 }
18
19 int hcf(int n1, int n2)
20 {
21     if (n2 != 0)
22         return hcf(n2, n1 % n2);
23     else
24         return n1;
25 }
```

PROBLEMS OUTPUT TERMINAL DEBUG CONSOLE

```
cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/" && gcc question9.c -o question9
indranilbain@Indranils-MacBook-Air ~ % cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/"question9
Enter two positive integers: 45
56
G.C.D of 45 and 56 is 1.
Do you wanna do this again (y/n) : y
Enter two positive integers: 12
88
G.C.D of 12 and 88 is 4.
Do you wanna do this again (y/n) : 
```

10. Write a recursive function for binary search where the function will accept the base address of the array, lower and upper index of the portion of the array to be searched and the key element to be searched from the array as inputs.

Ans.

```
Users > indranilbain > Projects > vs code > C code Assignment 7 > question10.c > main()
1  #include <stdio.h>
2  void bubble_sort(int m, int arr[]);
3  void binary_search(int arr[], int low, int high, int key);
4  int main()
5  {
6
7      char choice = 'y' ;
8      while (choice != 'n')
9      {
10
11         int list[10], val, i;
12         printf("Enter the elements of the array: \n");
13         for (i = 0; i < 10; i++)
14             scanf("%d", &list[i]);
15         bubble_sort(10, list);
16         printf("Enter the value to be searched for: ");
17         scanf("%d", &val);
18         binary_search(list, 0, 10, val);
19         printf("\nDo you wanna do this again ? (y/n): ");
20         getchar();
21         choice = getchar();
22     }
23 }
24
25 void bubble_sort(int m, int arr[])
26 {
27     int i, temp, j;
28     for (i = 0; i < m; i++)
29     {
30         for (j = i; j < m; j++)
31         {
32             if (arr[i] > arr[j])
33             {
34                 temp = arr[i];
35                 arr[i] = arr[j];
36                 arr[j] = temp;
37             }
38         }
39     }
40 }
41
```

```
PROBLEMS  OUTPUT  TERMINAL  DEBUG CONSOLE

cd "/Users/indranilbain/Projects/vs code/C code Assignment 7/" && gcc question10.c -o q
indranilbain@Indranils-MacBook-Air ~ % cd "/Users/indranilbain/Projects/vs code/C code
t 7/"question10
Enter the elements of the array:
2
4
6
8
10
12
14
16
18
20
Enter the value to be searched for: 4
Element found
Do you wanna do this again ? (y/n): n
indranilbain@Indranils-MacBook-Air C code Assignment 7 %
```

-: End :-

