

Lab 8

Functions in C

Marks: 5

Question 01:

Alia's Math teacher give her an assignment to find all perfect numbers within a range. She studied number theory and find that a perfect number is a positive integer that is equal to the sum of its proper positive divisors, that is, the sum of its positive divisors excluding the **number** itself help her in assignment by defining function to print perfect numbers in given range.

```
Enter lower limit to print perfect numbers: 1
Enter upper limit to print perfect numbers: 10000
All perfect numbers between 1 to 10000 are:
6, 28, 496, 8128,
```

Question 02:

Aisha is a student of 5th standard having interest in programming. She received an assignment from her teacher in which prime factors of given number are to be found. The assignment is to be submitted hand-written. She has completed her assignment but before submitting it, she wants to verify the answers. She has decided to make a program which will verify the answers. All she has to do is to provide that number to the program and program does the rest.

Question 03:

Bilal is shifting from Karachi to Islamabad, he wants to go by Air. He has packed his all stuff in rectangular/cube cardboard cartons. But the targeted airline has restrictions over the volume of carriage cartons., not more than 2000000 cm^3 . So he decided to find volume of all cartons he packed. Problem arises when he saw that cartons have mentioned only zero, one or two dimensions, he knew that the company he bought cartons from has a minimum dimension of 30 cm for a default volume of 27000 cm^3 Cube carton. Help Bilal in finding volumes of all cartons he packed by defining a separate function to calculate volume.

Question 04:

Point out the errors, if any, in the following programs:

(a)

```
main( )
{
    int i = 3, j = 4, k, l ;
    k = addmult ( i, j ) ;
    l = addmult ( i, j ) ;
    printf ( "\n%d %d", k, l ) ;
}

addmult ( int ii, int jj )
{
    int kk, ll ;
    kk = ii + jj ;
    ll = ii * jj ;
    return ( kk, ll ) ;
}
```

(b)

```
main( )
{
    int a ;
    a = message( ) ;
}

message( )
{
    printf ( "\nViruses are written in C" ) ;
    return ;
}
```

(c)

```
main( )
{
    float a = 15.5 ;
    char ch = 'C' ;
    printit ( a, ch ) ;
}

printit ( a, ch )
{
    printf ( "\n%f %c", a, ch ) ;
}
```

(d)

```
main( )
{
    message( ) ;
    message( ) ;
}

message( ) ;
{
    printf ( "\nPraise worthy and C worthy are synonyms" ) ;
}
```

(e)

```
main( )
{
    let_us_c( )
    {
        printf ( "\nC is a Cimple minded language !" ) ;
        printf ( "\nOthers are of course no match !" ) ;
    }
}
```

(f)

```
main( )
{
    message( message ( ) ) ;
}

void message( )
{
    printf ( "\nPraise worthy and C worthy are synonyms" ) ;
}
```

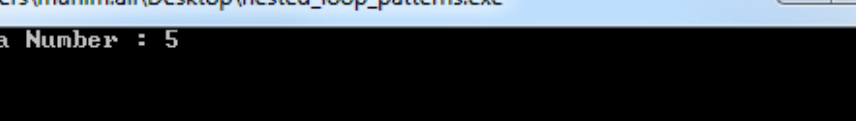
Question 05:

Write a function that takes N as argument and print shapes. Shape A) should have $2N+1$ rows as shown below here $N=10$.

A)

[illegible]

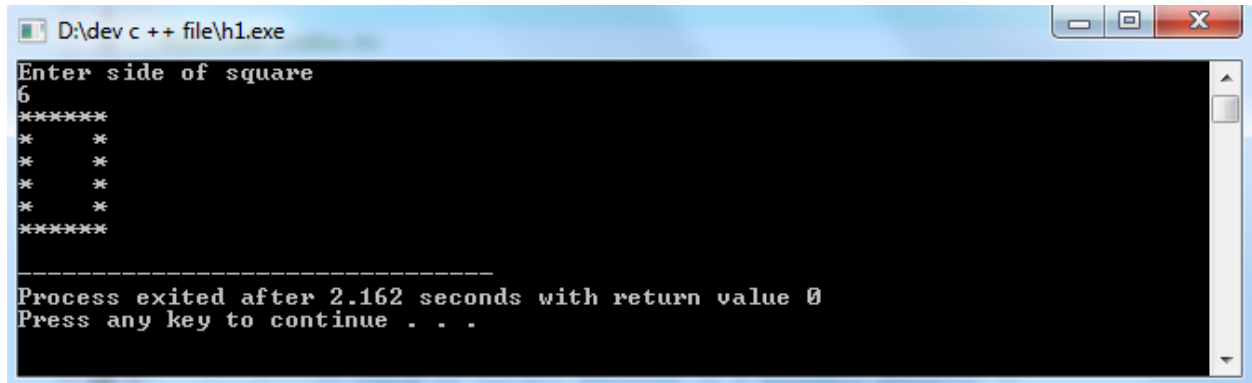
B) Generate the following patterns:



The screenshot shows a Windows command prompt window with the title bar "C:\Users\munim.ali\Desktop\nested_loop_patterns.exe". The prompt displays the output of a program where the user has entered the number 5. The output consists of four lines of nested loop patterns: "1", "121", "12321", and "1234321". Below these patterns, a separator line of dashes is shown, followed by the text "Process exited after 1.559 seconds with return value 0" and "Press any key to continue . . . _". The window has a standard Windows interface with minimize, maximize, and close buttons in the title bar and a scrollbar on the right side.

```
C:\Users\munim.ali\Desktop\nested_loop_patterns.exe
Enter a Number : 5
1
121
12321
1234321
-----
Process exited after 1.559 seconds with return value 0
Press any key to continue . . . _
```

C) Write a function in C to print hollow square star pattern



The screenshot shows a window titled "D:\dev c ++ file\h1.exe". The terminal displays the following text:

```
Enter side of square
6
*****
*       *
*       *
*       *
*       *
*****

-----
Process exited after 2.162 seconds with return value 0
Press any key to continue . . .
```