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Subject: Programing Fundamentals LAB

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Problem 1: Cricket Match

```c
#include <stdio.h>
int main()
{
   int score, wickets;
   printf("Enter  total scores: \n");
   scanf("%d", &score);
   printf("Enter remaining wickets : \n");
   scanf("%d", &wickets);
   // cheacking scores & wickets greater than 0
   if (score > 0 && wickets >= 0)
   { // if score greater than 300
      if (score > 300)
      {
         printf("Pakistan won by %d wickets. \n", wickets);
      }
      // if score less than 300
      else if (score < 300)
      { //  finding reamining scores
         int a = 300 - score;
         printf("Pakistan Need %d runs while %d  wickets are  in hand \n", a, wickets);
      } // if score is 300 and zero wickets in hand
      else if (score == 300 && wickets == 0)
      {
         printf("Match is drawn. \n");
      }
   }
   // if score and wickets are less than zero
   else
      printf("Score & wickets cannot be less than 0 ");
   return 0;
}
```

Output

Output

```
/tmp/fnvqY6HDMG.o
Enter  total scores:
325
Enter remaining wickets :
5
Pakistan won by 5 wickets.
```

Output

```
/tmp/fnvqY6HDMG.o
Enter  total scores:
135
Enter remaining wickets :
6
Pakistan Need 165 runs while 6  wickets are  in hand
```

Problem 2 : (if with logical operators)

```c
#include <stdio.h>
int main()
{
   int age, fees = 0;
   char membership;
   //Taking input from the user.
   printf("Press M  if you are a member else  N \n");
   scanf("%c", &membership);
   printf(" Enter age : \n");
   scanf("%d", &age);
   // if user is a member & age is less than 65
   if ((membership == 'm' || membership == 'M') && age < 65)
   {
      fees = 10;
      printf("%d $ is your seminar fee", fees);
   }
     // if user is a member & age is more  than 65
   else if ((membership == 'm' || membership == 'M') && age >= 65)
   {
      fees = 5;
      printf("%d $ is your seminar fee", fees);
   }
   else
   // if user is not a Member
   {
      fees = 20;
      printf("You are not a member %d $ is your seminar fee  \n", fees);
   }
   return 0;
}
```

Output:

```
Output
/tmp/fnvqY6HDMG.o
Press M  if you are a member else  N
m
Enter age :
70
5 $ is your seminar fee
```

```
Output
/tmp/fnvqY6HDMG.o
Press M  if you are a member else  N
n
Enter age :
50
You are not a member 20 $ is your seminar fee
```

Problem 3: Quadratic Equation

```
#include <stdio.h>
#include <math.h>
int main()
{    int a, b, c;
   double discrimenent, root1, root2, imaginary_part, real_part;
   printf("Enter cofficent of a,b & c \n");
   scanf("%d", &a);
   scanf("%d", &b);
   scanf("%d", &c);
   if (a > 0 && b > 0 && c > 0)
   {    // finding discrimrnenet
      discrimenent = b * b - 4 * a * c;
      if (discrimenent > 0)
      {
         //  discrimrnenet is greater than zero
         root1 = (-b + sqrt(discrimenent) / 2 * a);
         root2 = (-b - sqrt(discrimenent) / 2 * a);
         printf("Root 1 is  %.2lf \n", root1);
         printf("Root 2 is  %.2lf \n", root2);
      }
      else if (discrimenent == 0)
      {   //  discrimrnenet is equal to zero
         root1 = root2 = (-b) / (2 * a);
         printf("Root 1 = Root 2 = %.2lf", root1);
      }
      else
      {   //  discrimrnenet is less than zero
         real_part = -b / (2 * a);
         imaginary_part = sqrt(-discrimenent) / (2 * a);
         printf("Root 1 = %.2lf +  %.2lf \n", real_part, imaginary_part);
         printf("Root 2 = %.2lf -  %.2lf \n", real_part, imaginary_part);
```

```
    }
  }
  else
    printf("The value can't be zero \n");
  return 0;
}
```

Output:

```
Output
/tmp/fnvqY6HDMG.o
Enter cofficent of a,b & c 1
2
2
Root 1 = -1.00 +  1.00
Root 2 = -1.00 -  1.00
```

```
Output
/tmp/fnvqY6HDMG.o
Enter cofficent of a,b & c
1
6
2
Root 1 is  -3.35
Root 2 is  -8.65
```

Problem 4: Largest palindrome product

```
#include <stdio.h>
int palindromic(int n)
{
  int reverse = 0, temp = n;
  while (temp != 0)
  {   // Reversing the number
    reverse = 10 * reverse + (temp % 10);
    temp = temp / 10;
  }
   // if reverse equal to orignal returning n :
  return reverse == n;
}
int main()
{
  int i=0, j=0, max = 0;
  // loop start from smallest 3 digit function for 1st number :
  for(i = 100;i <1000;i++)
```

```
  {
      // loop start from smallest 3 digit function for 2nd number :
     for (j=100; j<1000;j++)
     {   //product of two numbers :
        int p = i * j;
        //calling function:
        if (palindromic(p) && p > max)
        {
           // value stored in max:
           max = p;
        }
     }
  }
  printf(" \" %d \"is the largest  largest palindrome number made from the product of two 3-digit numbers \n", max);
  return 0;
}
```

Output:

```
Output                                                    Clear
/tmp/fnvqY6HDMG.o
" 906609 "is the largest  largest palindrome number made from the product of two 3-digit
   numbers
```

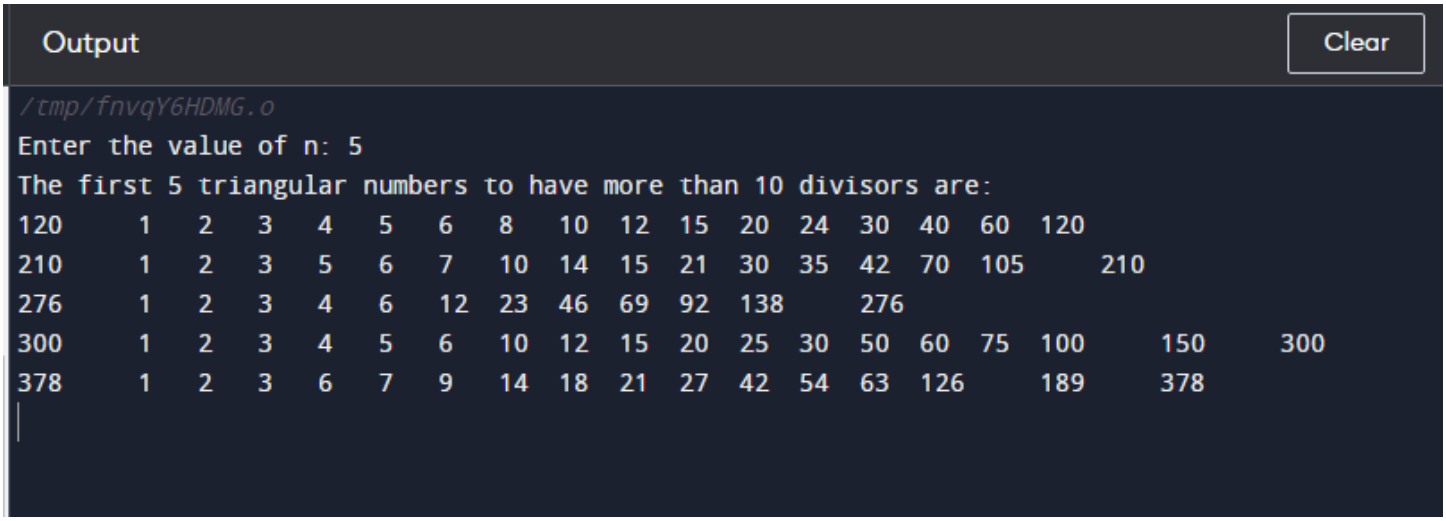
Problem 5: Highly divisible triangular number

```c
#include <stdio.h>
#include <math.h>

int main()
{
   int n, i, count = 0;
   printf("Enter the value of n: ");
   scanf("%d", &n);
   printf("The first %d triangular numbers to have more than 10 divisors are: \n", n);
   for(i = 1; ; i++)
   {      // finding triangular number
      int triangle_number = (i * (i + 1)) / 2;
      int divisor = 0 ;
      // finding number having 10 divisors
      for(int j = 1; j <= sqrt(triangle_number); j++)
      {
         if(triangle_number % j == 0)
         {
            if(j == triangle_number / j)
               divisor++;
            else
               divisor = divisor + 2;
         }
      }
      // when number have 10 divisor
      if(divisor > 10)
      {
         printf("%d  \t", triangle_number);
         count++;
         // printing divisor of the triangular number
       for (int l = 1; l <= triangle_number ; l++)
         {
            if (triangle_number %l==0)
               printf("%d \t",l);
            }
             printf("\n");
      }
      // when we have required number of values break it
      if(count == n)
      {

         break;
   }
   }
   return 0;
}
```

Output:



Problem 6: Random Walk

```c
#include<stdio.h>
#include<math.h>
int main()
{
   int x=0,y=0,x1=0,y1=0,temp=0,temp1=0,count=0;
   float avg,s;
   while(1)
  {
   printf("Enter new coordinates: \n");
   printf("Enter value of x1 \n");
   scanf("%d",&x1);
   printf("Enter value of y1 \n");
   scanf("%d",&y1);
    // finding Distance
      s=s+sqrt((x-x1)*(x-x1)+(y-y1)*(y-y1));
      // swaping values of  old and new coordinats
     temp=x;
    x=x1;
     x1=temp;
     temp1=y;
     y=y1;
     y1=temp1;
     count++;
     avg=s/count;
     // Terminate when old & new coordinates are equal
     if (x==x1 && y==y1)
    break;
 }
  printf("Total dstance covered is %.2f \n ",s);
 printf("Total Step taken are %d \n ",count-1);
 printf("Average distance between each point is %.2f",avg);
```

```
    return 0 ;
}
```

Output:

```
Output

/tmp/fnvqY6HDMG.o
Enter new coordinates:
Enter value of x1
54
Enter value of y1
95
Enter new coordinates:
Enter value of x1
54
Enter value of y1
23
Enter new coordinates:
Enter value of x1
21
Enter value of y1
25
Enter new coordinates:
Enter value of x1
14
Enter value of y1
14
Enter new coordinates:
Enter value of x1
14
Enter value of y1
14
Total distance covered is 227.37
 Total Step taken are 4
 Average distance between each point is 45.47
```

Problem 7: Pattern

```
#include <stdio.h>
void Pattern1(int n )
{

   for ( int i = 1; i <= n; i++)
   {
      printf("\n");
      for (int j = 1; j <= i; j++)
      {
         printf("%d", i);
      }
   }
}
void Pattern2(int n)
{  int i,j;
  for (i = 1; i <= n; i++)
   {
      printf("\n");
      for (j = 1; j <= (n - i); j++)
      {
         printf(" ");
      }
      for (j = 1; j <= i; j++)
      {
         printf("%d", j);
      }
   }
}
void Pattern3(int n)
{ int i,j;
for (i = 1; i <= n; i++)
   {
      for (j = 1; j <= i; j++)
      {
         printf("%c", 'A' + j - 1);
      }
      printf("\n");
   }
}
void Pattern4(int n)
{   int i,j;
    for (i = 1; i <= n; i++)
   {
      for (j = 5; j > i; j--)
         printf("  ");
      for (j = 1; j <= i; j++)
         printf("%d ", j);
      for (j = j - 2; j >= 1; j--)
```

```
            printf("%d ", j);
        printf("\n");
    }

}
void Pattern5(int n)
{ int i,j;
    for(i = 0; i < n; i++)
    {
        for(j = 0; j < (2 * n); j++)
        {
            if(i + j <= n - 1)
                printf("*");
            else
                printf(" ");
            if((i + n) <= j)
                printf("*");
            else
                printf(" ");
        }
        printf("\n");
    }
}
void Pattern6(int n)
{ int i,j;
 for(i=0;i<n;i++)
       {
         for(j=0;j<n;j++)
            {
             if(i==0||i+j==n-1||i==n-1)
              {
                 printf("*");
                }
                    else
                   {
                       printf(" ");
                   }
               }
           printf("\n");
             }
}
void Pattern7(int n)
{   int i,j;
     for(i = 0; i < n; i++){

          for(j = 0; j < n; j++){

            if(i==0 || i==n-1 || j==0 || j==n-1)
                printf("*");
            else
```

```
            printf(" ");
        }
        printf("\n");
    }
}
int main()
{
   int  n = 0;
    printf("Enter the number of rows: \n");
    scanf("%d", &n);
    printf("\n..........Pattern 1..... \n");
     Pattern1(n);
    printf("\n..........Pattern 2..... \n");
    Pattern2(n);
    printf("\n ..........Pattern 3..... \n");
    Pattern3(n);
    printf("\n ..........Pattern 4 ..... \n");
     Pattern4(n);
     printf("\n ..........Pattern 5 ..... \n");
      Pattern5(n);
 printf("\n ..........Pattern 6 .....\n");
      Pattern6(n);
 printf("\n ..........Pattern 7 ..... \n");
       Pattern7(n);
       return 0;
}
```

Output:

```
/tmp/fnvqY6HDMG.o
Enter the number of rows:
5
..........Pattern 1.....

1
22
333
4444
55555
..........Pattern 2.....

    1
   12
  123
 1234
12345
 ..........Pattern 3.....
A
AB
ABC
ABCD
ABCDE
```

```
 ..........Pattern 4 ..................
      1
     1 2 1
    1 2 3 2 1
  1 2 3 4 3 2 1
1 2 3 4 5 4 3 2 1

 ..........Pattern 5 ..................
* * * * *  * * * * *
* * * *      * * * *
* * *          * * *
* *              * *
*                  *

 ..........Pattern 6 ......................
*****
   *
  *
 *
*****

 ..........Pattern 7 ........................
*****
*   *
*   *
*   *
*****
```