Programming Fundamentals Quiz 1

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Section: 1D

Exercise

if, if-else, Nested if-elses

[A] What would be the output of the following programs:

```
(a) main( )
{
 int a = 300, b, c ;
 if ( a >= 400 )
 b = 300 ;
 c = 200 ;
 printf ( "\n%d %d", b, c ) ;
```
Output:

0 200

```
(b) main( )
{
 int a = 500, b, c ;
 if ( a >= 400 )
b = 300 ;
c = 200 ;
printf ( "\n%d %d", b, c ) ;
```
Output:

300 200

```
(c) main( )
{
 int x = 10, y = 20 ;
 if ( x == y ) ;
 printf ( "\n%d %d", x, y ) ;
}
```
Output:

10 20

```
(d) main( )
{
 int x = 3, y = 5 ;
 if ( x == 3 )
 printf ( "\n%d", x ) ;
 else ;
 printf ( "\n%d", y ) ;
}
```

Output:

3
5

```
(e) main( )
{
 int x = 3 ;
 float y = 3.0 ;
 if ( x == y )
 printf ( "\nx and y are equal" ) ;
 else
 printf ( "\nx and y are not equal" ) ;
}
```

Output:

x and y are equal

```
(f) main( )
{
 int x = 3, y, z ;
 y = x = 10 ;
 z = x < 10 ;
 printf ( "\nx = %d y = %d z = %d", x, y, z ) ;
}
```

Output:

x = 10 y = 10 z = 0

```
(g) main( )
{
 int k = 35 ;
 printf ( "\n%d %d %d", k == 35, k = 50, k > 40 ) ;
}
```

Output:

0 50 0

```
(h) main( )
{
 int i = 65 ;
 char j = 'A' ;
 if ( i == j )
 printf ( "C is WOW" ) ;
 else
 printf( "C is a headache" ) ;
}
```

Output:

C is WOW

```
(i) main( )
{
 int a = 5, b, c ;
 b = a = 15 ;
 c = a < 15 ;
 printf ( "\na = %d b = %d c = %d", a, b, c ) ;
}
```

Output:

a = 15 b = 15 c = 0

```
(j) main( )
{
 int x = 15 ;
 printf ( "\n%d %d %d", x != 15, x = 20, x < 30 ) ;
}
```
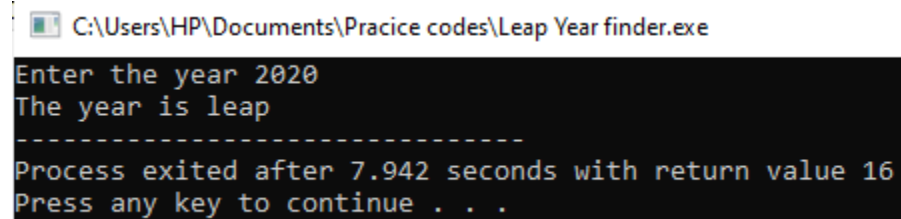
Output:

1 20 0

[F] Attempt the following:

(a) Any year is entered through the keyboard, write a program to determine whether the year is leap or not. Use the logical operators && and ||.

```c
#include <stdio.h>
int main( )
{
 int a;
 printf("Enter the year");
 scanf("%d", &a);
 a= (a%4);

 if (!(a&&1)){
        printf("The year is leap");
 }
if (a||0){
        printf("The year is not leap");
 }
}
```

Output:


```
 C:\Users\HP\Documents\Pracice codes\Leap Year finder.exe

Enter the year 2020
The year is leap
-----------------------------
Process exited after 7.942 seconds with return value 16
Press any key to continue . . .
```

(b) Any character is entered through the keyboard, write a program to determine whether the character entered is a capital letter, a small case letter, a digit or a special symbol. The following table shows the range of ASCII values for various characters. The following table shows the range of ASCII values for various characters.

Characters	ASCII Values
A – Z	65 – 90
a – z	97 – 122
0 – 9	48 – 57
special symbols	0 - 47, 58 - 64, 91 - 96, 123 - 127

```
#include <stdio.h>
int main(){
        char c;
        printf("Please enter your character ");
        scanf("%c", &c);
        if (c>=65 && c<=90)
                printf("It is a Captial letter");
        if (c>=97 && c<=122)
                printf("It is a Small letter");
        if (c>=48 && c<=57)
                printf("It is a Number");
        if ((c>=0 && c<=47)||(c>=58 && c<=64)||(c>=91 && c<=96)||(c>=123 && c<=127))
                printf("It is an Special Symbol");
}
```

Output:

C:\Users\HP\Documents\Pracice codes\type of character.exe

```
Please enter your character Z
It is a Captial letter
--------------------------------
Process exited after 5.161 seconds with return value 90
Press any key to continue . . .
```

(c) An Insurance company follows following rules to calculate premium.
(1) If a person's health is excellent and the person is between 25 and 35 years of age and lives in a city and is a male then the premium is Rs. 4 per thousand and his policy amount cannot exceed Rs. 2 lakhs.
(2) If a person satisfies all the above conditions except that the sex is female then the premium is Rs. 3 per thousand and her policy amount cannot exceed Rs. 1 lakh.
(3) If a person's health is poor and the person is between 25 and 35 years of age and lives in a village and is a male then the premium is Rs. 6 per thousand and his policy cannot exceed Rs. 10,000.
(4) In all other cases the person is not insured. Write a program to output whether the person should be insured or not, his/her premium rate and maximum amount for which he/she can be insured.

```c
#include <stdio.h>
int main(){
        int age;
        char sex, loc, heal;

        printf("Enter your age please");
        scanf("\n%d", &age);

        printf("Enter your sex please? \n (M= Male F= Female) ");
        scanf("\n%c", &sex);

        printf("Enter your location please\n (C= city V= Village) ");
        scanf("\n%c", &loc);

        printf("Enter your health condition please? \n (E= Excellent P= Poor)");
        scanf("\n%c", &heal);

        if
((age>=25&&age<=35)&&(sex=='M'||sex=='m')&&(loc=='c'||loc=='C')&&(heal=='e'||heal=='E')){

                printf(" \nThe Person is insured \nHence the Premium rate  is Rs. 4/1000  \nMaximum
amount for insurance is Rs. 2 lakhs");
        }
        else if
((age>=25&&age<=35)&&(sex=='F'||sex=='f')&&(loc=='C'||loc=='c')&&(heal=='e'||heal=='E')){
                printf(" \nThe Person is insured \nHence the Premium rate  is Rs. 3/1000  \nMaximum
amount for insurance is Rs. 1 lakh");
        }
        else if
((age>=25&&age<=35)&&(sex=='M'||sex=='m')&&(loc=='c'||loc=='C')&&(heal=='p'||heal=='P')){
                printf(" \nThe Person is insured \nHence the Premium rate  is Rs. 6/1000  \nMaximum
amount for insurance is Rs. 10 thounsands");
        }
        else{
                printf("The Person is not insured");
        }
}
```

Output:


```
C:\Users\HP\Documents\Pracice codes\insurance.exe
Enter your age please27
Enter your sex please?
 (M= Male F= Female) F
Enter your location please
 (C= city V= Village) C
Enter your health condition please?
 (E= Excellent P= Poor)E

The Person is insured
Hence the Premium rate  is Rs. 3/1000
Maximum amount for insurance is Rs. 1 lakh
------------------------------
Process exited after 9.818 seconds with return value 107
Press any key to continue . . .
```

(d) A certain grade of steel is graded according to the following conditions:
(i) Hardness must be greater than 50
(ii) Carbon content must be less than 0.7
(iii) Tensile strength must be greater than 5600
The grades are as follows:
Grade is 10 if all three conditions are met
Grade is 9 if conditions (i) and (ii) are met
Grade is 8 if conditions (ii) and (iii) are met
 Grade is 7 if conditions (i) and (iii) are met
Grade is 6 if only one condition is met
Grade is 5 if none of the conditions are met
Write a program, which will require the user to give values of hardness, carbon content and tensile
strength of the steel under consideration and output the grade of the steel.

```c
#include <stdio.h>
int main(){
        int h,t; // h= hardness c=carbon t= tensile
        float c;
        printf("Enter the hardness? ");
        scanf("%d",&h);
        printf("\nEnter the content of Carbon? ");
        scanf("%f",&c);
        printf("\nEnter the strength of Tensile? ");
        scanf("%d",&t);

        if ((h>50)&&(c<0.7)&&(t>5600))
        printf("\nGRADE 10");

else if  ((h>50)&&(c<0.7))
        printf("\nGRADE 9");

else if ((c<0.7)&&(t>5600))
        printf("\nGRADE 8");

else if ((h>50)&&(t>5600))
        printf("\nGRADE 7");

else if ((h>50)||(c<0.7)||(t>5600))
        printf("\nGRADE 6");
else
        printf("\nGRADE 5");
}
```
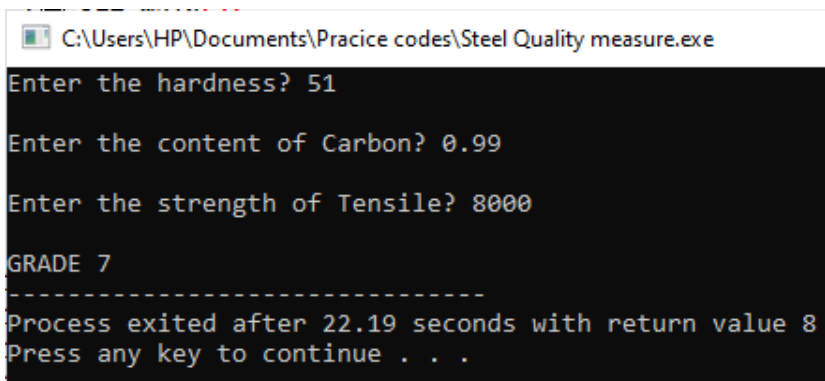
Output:

```
C:\Users\HP\Documents\Pracice codes\Steel Quality measure.exe

Enter the hardness? 51

Enter the content of Carbon? 0.99

Enter the strength of Tensile? 8000

GRADE 7
---------------------------------
Process exited after 22.19 seconds with return value 8
Press any key to continue . . .
```

[G] What would be the output of the following programs:

```
(a) main( )
{
 int i = -4, j, num ;
 j = ( num < 0 ? 0 : num * num ) ;
 printf ( "\n%d", j ) ;
}
```
Output:

Variable is not defined, therefore this program will not execute.

```
(b) main( )
{
 int k, num = 30 ;
 k = ( num > 5 ? ( num <= 10 ? 100 : 200 ) : 500 ) ;
 printf ( "\n%d", num ) ;
}
```
Output:

30

```
(c) main( )
{
 int j = 4 ;
 ( !j != 1 ? printf ( "\nWelcome") : printf ( "\nGood Bye") ) ;
}
```
Output:

Welcome

[H] Point out the errors, if any, in the following programs:

```
(a) main( )
{
 int tag = 0, code = 1 ;
 if ( tag == 0 )
 ( code > 1 ? printf ( "\nHello" ) ? printf ( "\nHi" ) ) ;
 else
 printf ( "\nHello Hi !!" ) ;
}
```
Error:

The symbol of question mark "?" is used in the place of ":" in ternary operation in line 5.

```
(b) main( )
{
 int ji = 65 ;
 printf ( "\nji >= 65 ? %d : %c", ji ) ;
}
```
Error:

We have not defined any character, yet we have used a format string of character.

```
(c) main( )
{
 int i = 10, j ;
 i >= 5 ? ( j = 10 ) : ( j = 15 ) ;
 printf ( "\n%d %d", i, j ) ;
}
```
Error:

No Error.

```
(d) main( )
{
 int a = 5 , b = 6 ;
 ( a == b ? printf( "%d",a) ) ;
}
```
Error:

In line no. 4, the third statement is not given, which should been executed if condition becomes false. In addition a semi colon ";" is used at the place of a colon ":"

```
(e) main( )
{
 int n = 9 ;
 ( n == 9 ? printf( "You are correct" ) ; : printf( "You are wrong" ) ;) ;
}
```
Error:

In line 4, to extra semi-colons ";" are used in the parenthesis which should not have been used, so the correct statement would be:
(n == 9 ? printf("You are correct") : printf("You are wrong")) ;

```
(f) main( )
{
 int kk = 65 ,ll ;
 ll = ( kk == 65 : printf ( "\n kk is equal to 65" ) : printf ( "\n kk is not equal to 65" ) ) ;
 printf( "%d", ll ) ;
}
```

Error:

In line 4, we the first colon ":" is used incorrectly here, a question mark "?" should be used at its place.

```
(g) main( )
{
 int x = 10, y = 20 ;
 x == 20 && y != 10 ? printf( "True" ) : printf( "False" ) ;
}
```

Error:

No error in this program.

[I] Rewrite the following programs using conditional operators.

```
(a) main( )
{
 int x, min, max ;
 scanf ( "\n%d %d", &max, &x ) ;
 if ( x > max )
 max = x ;
 else
 min = x ;
}
```

After rewrite:

```
main( )
{
 int x, min, max ;
 scanf ( "\n%d %d", &max, &x ) ;
 x > max ? (max=x) : (min=x);
}
```

```
(b) main( )
{
 int code ;
 scanf ( "%d", &code ) ;
 if ( code > 1 )
 printf ( "\nJerusalem" ) ;
 else
 if ( code < 1 )
 printf ( "\nEddie" ) ;
 else
 printf ( "\nC Brain" ) ;
}
```

After Rewrite:

```
main()
{
int code ;
 scanf ( "%d", &code ) ;
 code > 1? printf("\nJerusalem") : (code<1? printf("\nEddie")) : printf("\nC Brain");
}
```

```
(c) main( )
{
 float sal ;
 printf ("Enter the salary" ) ;
 scanf ( "%f", &sal ) ;
 if ( sal < 40000 && sal > 25000 )
 printf ( "Manager" ) ;
 else
 if ( sal < 25000 && sal > 15000 )
 printf ( "Accountant" ) ;
 else
 printf ( "Clerk" ) ;
}
```

After Rewrite:

```
{
 float sal ;
 printf ("Enter the salary" ) ;
 scanf ( "%f", &sal ) ;

 (sal < 40000 && sal > 25000 )? printf ( "Manager" ) : ( sal < 25000 && sal > 15000 )? printf(
"Accountant" ):  printf ( "Clerk" ) ;
}
```

[J] Attempt the following:

(a) Using conditional operators determine:

(1) Whether the character entered through the keyboard is a lower case alphabet or not.

(2) Whether a character entered through the keyboard is a special symbol or not

Program:

```
#include <stdio.h>
int main(){
                char c;
        printf("Please enter your character ");
        scanf("%c", &c);

        (c>=97&&c<=122 )? printf("It is a lowered case letter") : printf(" \nIt is not a lowered case
alphabet");

        (c>=0 && c<=47)||(c>=58 && c<=64)||(c>=91 && c<=96)||(c>=123 && c<=127) ? printf(" \nIt
is an Special Symbol"): printf("\nIt is not an special symbol");
}
```

(b) Write a program using conditional operators to determine whether a year entered through the keyboard is a leap year or not.

Program:

```
#include <stdio.h>
int main( )
{
 int a;
 printf("Enter the year");
 scanf("%d", &a);
 a= (a%4);

 (!(a&&1))? printf("The year is leap"): a||0? printf("The year is not leap"): printf("");
}
```

(c) Write a program to find the greatest of the three numbers entered through the keyboard using conditional operators.

Program:

```
#include <stdio.h>
main (){
        int x,y,z,low;
        low= -99999999999;
        printf("enter the numbers\n");
        scanf("%d %d %d", &x, &y, &z);

        if (x> low ){
                low=x;}

        if(y>low){
        low=y;}

        if (z>low){
                low=z;
        }
        printf("The greatest number is %d", low);
        }
```