Birla Institute of Technology & Science, Pilani, Hyderabad Campus

First Semester 2020-2021
Computer Programming [CS F111] Lab 6

Practice Problems:

1. Write a prog using conditional operators to determine whether a year entered through the keyboard is leap year or not.

Code:

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

 (year%4==0 && year%100!=0) ? printf("%d is a leap year.", year) :
     (year%400 ==0 ) ? printf("%d is a leap year.", year) : printf("%d is not a leap year.", year);

  return 0;
}
```

Output:

Test Case 1:

```
Enter a year: 1900
1900 is not a leap year.
```

Test Case 2:

```
Enter a year: 2012
2012 is a leap year.
```

2.Write a C program to generate Pascal's triangle.

Code:

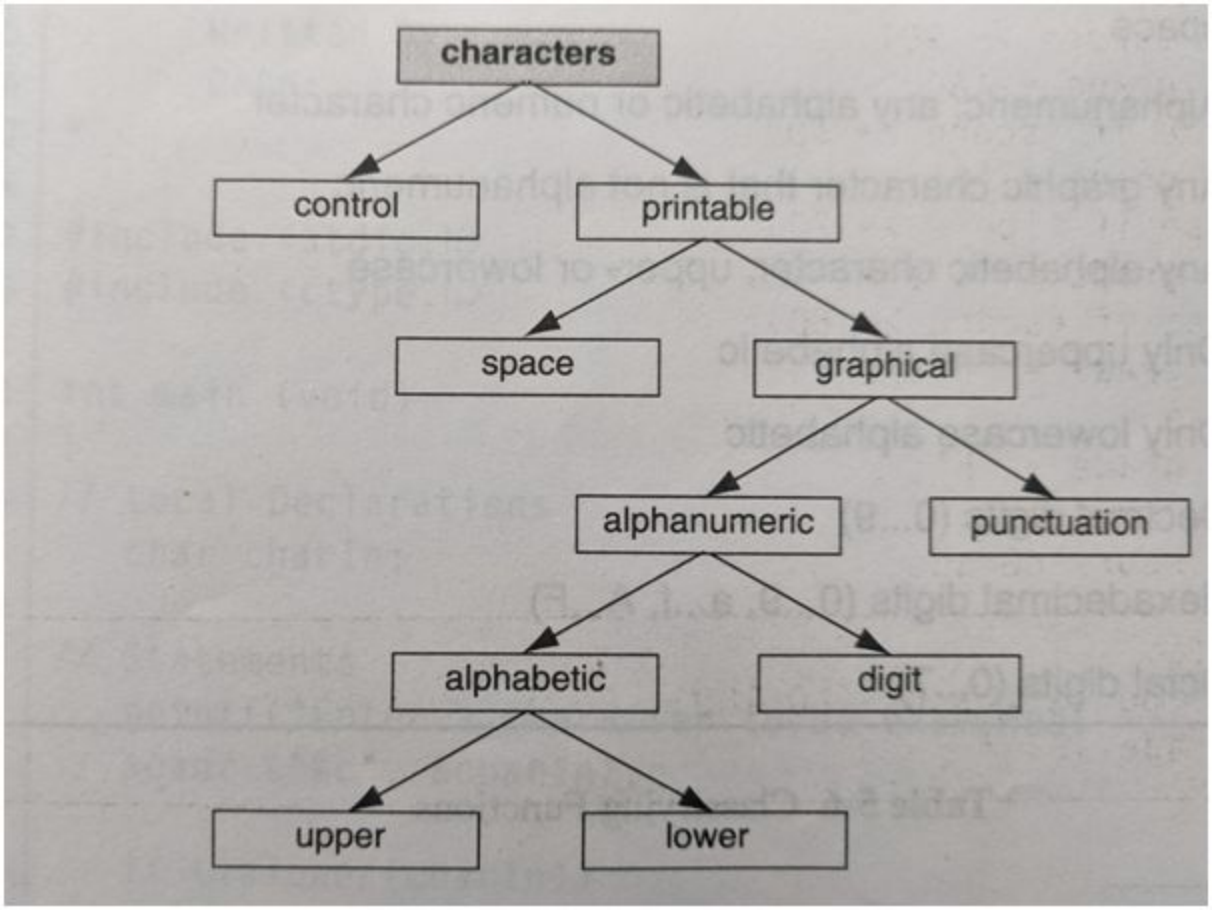
```
#include<stdio.h>
#include<ncurses.h>

void main()
```

```
{
 int bin,p,q,r,x;
 clear();
 bin=1;
 q=0;

 printf("Rows you want to input:");
 scanf("%d",&r);

 printf("\nPascal's Triangle:\n");

 while(q<r)
 {
  for(p=40-3*q;p>0;--p)
  printf(" ");
  for(x=0;x<=q;++x)
  {
    if((x==0)||(q==0))
      bin=1;
    else
      bin=(bin*(q-x+1))/x;
      printf("%6d",bin);
  }

 printf("\n");
 ++q;
 }
getch();
}
```

Output:

```
Rows you want to input:9

Pascal's Triangle:
                                        1
                                    1     1
                                1     2     1
                            1     3     3     1
                        1     4     6     4     1
                    1     5    10    10     5     1
                1     6    15    20    15     6     1
            1     7    21    35    35    21     7     1
        1     8    28    56    70    56    28     8     1
```

3. Write a program that tests a user entered character and displays its classification according to the ASCII classifications as shown in the below image. Write the program starting at the top of the classification tree and display all classifications that the character belongs to. For example, if the user enters a digit, you should display that it is printable, graphical, alphanumeric, and a digit. Use Switch statement in c to write this program.



Code:

```
#include<stdio.h>
int main()
{
	char ch;
	printf("Enter a character\n");
	scanf("%c", &ch);

	switch (ch < 32)
	{
		case 1: //ascii for control sequences is between 0 and 31
			printf("control\n");
```

```
		break;

		case 0:
			printf("printable\n");
			switch(ch)
			{
				case 32: //ascii for spacebar is 32
					printf("space\n");
				break;
				default:
					printf("graphical\n");
					switch((ch >= 65 && ch <= 90) || (ch >= 97 && ch <= 122)
|| (ch >= 48 && ch <= 57))
					{
						case 1:
							printf( "alphanumeric\n");

							switch(ch >= 48 && ch <= 57)
							{
								case 1://ascii for digits is between
48 and 57
									printf( "digit\n" );
								break;
								case 0:
									printf( "alphabetic\n" );
									switch (ch >= 65 && ch <= 90){
										case 0://ascii for
lower case is between 97 and 122
											printf( "lower
case\n");
										break;
										case 1://ascii for
upper case is between 65 and 90
											printf( "upper
case\n");
										break;
									}
								break;
							}
							break;
						case 0:
							switch((ch >= 33 && ch <= 47) || (ch >= 58
&& ch <= 64) || (ch >= 91 && ch <= 96) || (ch >= 123 && ch <= 126))
							{
								case 1:
									printf( "punctuation\n");
									break;
								case 0:
									printf("Unknown character
printed");
								break;
							}

							break;
					}
			}
		break;
```

```
        }

        return 0;
}
```

Output:

Test Case 1:

```
Enter a character
A
printable
graphical
alphanumeric
alphabetic
upper case
```

Test Case 2:

```
Enter a character
3
printable
graphical
alphanumeric
digt
```

4. An insurance company follows the following rules to calculate the premium to be paid by the client/ customer:

a. If a persons' health is excellent and the person is between 18 and 30 years of age, leaves in a city, and is a male then the premium is Rs.50 per 10,000 and his policy amount cannot exceed Rs. 3 lakhs INR.

b. If a person satisfies all the above conditions except that the sex is female, then the premium is Rs 30 per 10,000 and her policy amount cannot exceed Rs 2 lakhs INR.

c. If a persons' health is poor and the person is between 18 and 30 years of age and leaves in a village and is a male, then the premium is Rs. 70 per 10,000 and his policy cannot exceed Rs. 1 lakh.

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.

Code:

```
#include<stdio.h>
void main()
```

```
{
int age, premium, max_amount;
char health, location, sex;
printf("Enter Health --> e for excellent / p for poor \nEnter Location --> c for city / v for village");
printf("\nEnter sex --> m for male / f for female");
printf("\nEnter the health, age, location and sex of the person: ");

scanf ("%c %d %c %c", &health, &age, &location, &sex);

if ((health=='e') && ((age>=18)&&(age<=30)) && (location=='c') && (sex=='m'))
{
        premium=50;
        max_amount=3;
        printf("This person is insured.\n The payable premium is Rs. %d per 10,000 thousand.\nThe
        maximum policy amount is Rs. %d Lakhs INR.", premium, max_amount);
}
else if ((health=='e') && ((age>=18)&&(age<=30)) && (location=='c') && (sex=='f'))
{
        premium=30;
        max_amount=2;
        printf("This person is insured.\nThe payable premium is Rs. %d per 10,000 thousand.\nThe
        maximum policy amount is Rs. %d Lakhs INR.", premium, max_amount);
}

else if ((health=='p') && ((age>=18)&&(age<=30)) && (location=='v') && (sex=='m'))
{
        premium=70;
        max_amount=1;
        printf("This person is insured.\nThe payable premium is Rs. %d per 10,000 thousand.\nThe
        maximum policy amount is Rs. %d Lakh.", premium, max_amount);
}
else
{
        printf("This person is not insured.");
}
}
```

Output :
Test case 1 :

```
Enter Health --> e for excellent / p for poor
Enter Location --> c for city / v for village
Enter sex --> m for male / f for female
Enter the health, age, location and sex of the person: e 23 c m
This person is insured.
The payable premium is Rs. 50 per 10,000 thousand.
The maximum policy amount is Rs. 3 Lakhs INR.

...Program finished with exit code 120
Press ENTER to exit console.
```

Test case 2 :

```
Enter Health --> e for excellent / p for poor
Enter Location --> c for city / v for village
Enter sex --> m for male / f for female
Enter the health, age, location and sex of the person: e 34 c f
This person is not insured.

...Program finished with exit code 27
Press ENTER to exit console.
```

Test case 3:

```
Enter Health --> e for excellent / p for poor
Enter Location --> c for city / v for village
Enter sex --> m for male / f for female
Enter the health, age, location and sex of the person: p 24 v m
This person is insured.
The payable premium is Rs. 70 per 10,000 thousand.
The maximum policy amount is Rs. 1 Lakh INR.

...Program finished with exit code 119
Press ENTER to exit console.
```

Test case 4:

```
Enter Health --> e for excellent / p for poor
Enter Location --> c for city / v for village
Enter sex --> m for male / f for female
Enter the health, age, location and sex of the person: e 18 c f
This person is insured.
The payable premium is Rs. 30 per 10,000 thousand.
The maximum policy amount is Rs. 2 Lakhs INR

...Program finished with exit code 119
Press ENTER to exit console.
```

Exercise Problems (To be done at lab hours):

1. Rewrite the following code using conditional operator. Run it and submit the screenshot:

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

2. Rewrite the following code using conditional operator. Run it and submit the screenshot:

```
if ( c == 'E' )
c++;
if ( c == 'E')
printf ("Value is E\n");
```

3. Rewrite the following code fragment using one switch statement. Add any other needed declarations or assignments. Run the code and submit the screenshot of the run.

```
if (ch == 'A' || 'a')
countA++;
else if (ch == 'C' || 'c')
countC++;
else
printf ("error…");
```

NOTE: Upload the screenshots of the Exercise programs along with the displayed results into your corresponding Google Classroom.

PATH to Submit the Screenshots:
Google Classroom --> Classwork --> View Assignment --> Create/Upload