Birla Institute of Technology and Science, Pilani Hyderabad Campus
2nd semester 2020-21
CS F111 (Computer Programming), Lab 6

Q.1 Write a program using conditional operator (?:) to determine whether a year entered through the keyboard is **leap year** or not.

```c
#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;
}
```

input

```
Enter a year: 2021
2021 is not a leap year.
```

Q.2 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, lives 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 lives 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. Usage of if—else ladder.

```c
#include<stdio.h>
int main(){
    int age, premium, max_amount;
    char health, location, sex;
    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("The payable premium is Rs.%d", premium);
        printf("\tThe maximum policy amount is Rs. %d Lakhs INR", max_amount);
    }
    else if ((health=='e') && ((age>=18)&&(age<=30)) && (location=='c') && (sex=='f'))
    {
        premium=30;
        max_amount=2;
        printf("The payable premium is Rs%d", premium);
        printf("\t The maximum policy amount is Rs. %d Lakhs INR", max_amount);
    }
    else if ((health=='p') && ((age>=18)&&(age<=30)) && (location=='v') && (sex=='m'))
    {
        premium=70;
        max_amount=1;
        printf("The payable premium is Rs%d", premium);
        printf("\t The maximum policy amount is Rs. %d Lakhs INR", max_amount);
    }
    else
    {
        printf("This person is not insured.");
    }
}
```

input

```
e 23 c m
The payable premium is Rs.50    The maximum policy amount is Rs. 3 Lakhs INR
```

```
p 23 v m
The payable premium is Rs70     The maximum policy amount is Rs. 1 Lakhs INR
```

Q.3 Write a program that tests a user entered character and displays its classification according to the ASCII classifications as shown in Fig.1. 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 as shown in the output for digit 2. Use Switch statement in c to write this program.

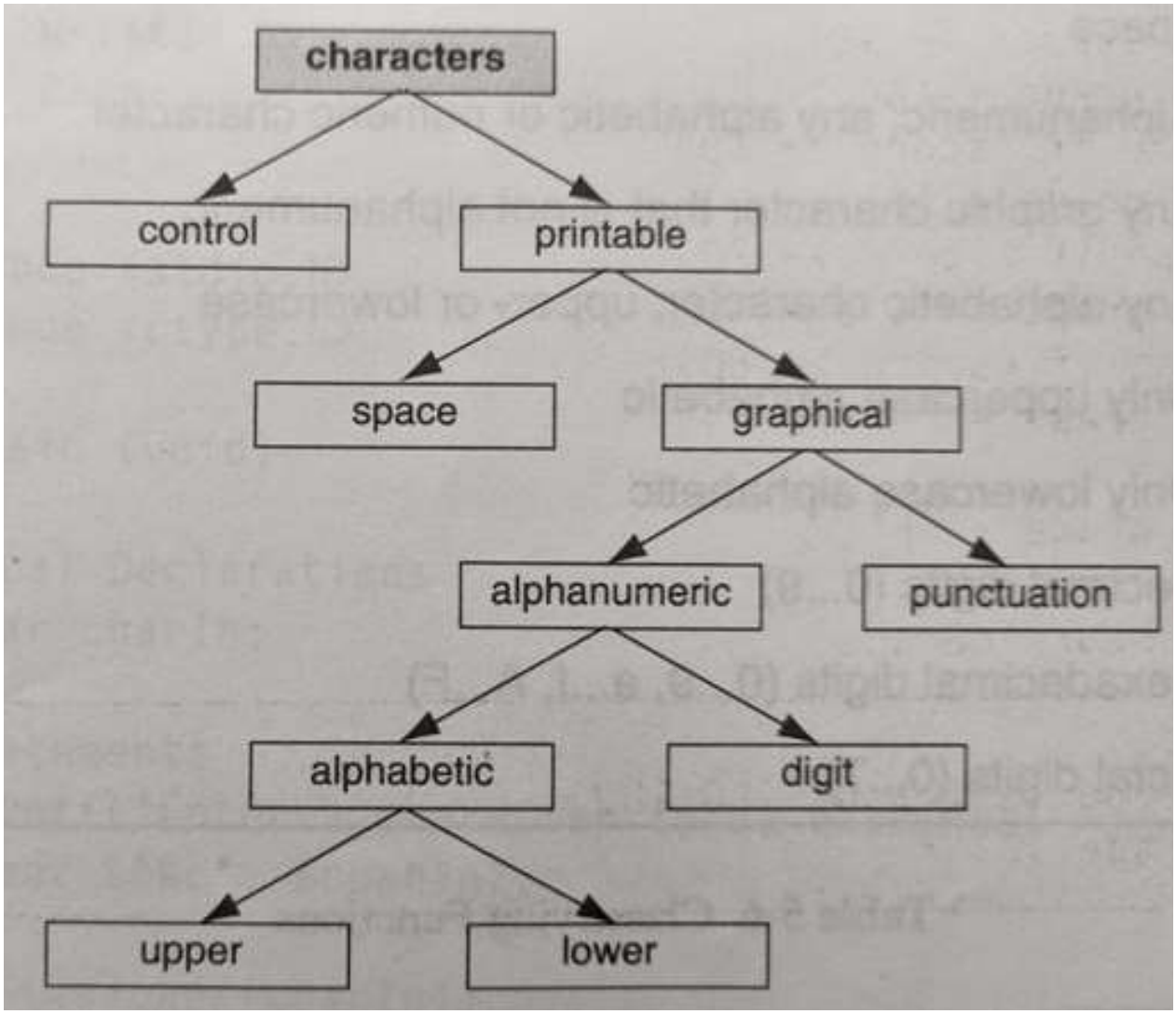
```c
#include<stdio.h>
int main()
{
    char ch;
    printf("Enter a character\n");
    scanf("%c", &ch);
    switch (ch < 32)
    {
    case 1: //ascii for control sequences is between 0 and 31
        printf("control\n");
        break;
    case 0:
        printf("printable\n");
        switch(ch)
        {
        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;
}
```

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

```
Enter a character
2
printable
graphical
alphanumeric
digit
```

```
Enter a character

printable
space
```



(Figure 1)

Q.4 Adding a list of numbers from standard input as shown in the output window. Example of **sentinel** controlled loop.

```c
#include <stdio.h>
int main ( )
{
  int x;
  int sum = 0;

  printf ("Enter your numbers: <EOF> to stop\n");
  while (scanf ("%d", &x) != EOF)
      sum += x;
  printf("The total is: %d\n", sum);
  return 0;
}
```

```
Enter your numbers: <EOF> to stop
21 65 3 2 -6
The total is: 85
```

Q.5 Using if and while, print 10 numbers per line. Input given is a number between 1 and 50.

```c
#include <stdio.h>
int main ( )
{
    int num;
    int lineCount;
    printf("Enter an integer between 1 and 50:");
    scanf("%d",&num);
    if (num > 50)
        num = 50;
     lineCount = 0;
    while (num > 0)
    {
        if (lineCount < 10)
              lineCount++;
        else
            {
              printf("\n");
              lineCount = 1;
             }
         printf ("%3d", num--);
     }
     return 0;
}
```

```
Enter an integer between 1 and 50:47
 47 46 45 44 43 42 41 40 39 38
 37 36 35 34 33 32 31 30 29 28
 27 26 25 24 23 22 21 20 19 18
 17 16 15 14 13 12 11 10  9  8
  7  6  5  4  3  2  1
```

Tasks: (Do any two from the below tasks)

(1) Write an equivalent program for Q.1 (checking leap year or not) using **if-else** statements.

(2) 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…");
```

(3) Print only the output up to one more than the half of the number given as input (in Q.5). Your modified code should give the below output: (Sample output):

```
Enter an integer between 1 and 50:34
 34 33 32 31 30 29 28 27 26 25
 24 23 22 21 20 19 18
```

```
Enter an integer between 1 and 50:13
 13 12 11 10  9  8  7
```
