PROGRAM 6

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.

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.

- Input variables :
  - Health
  - Age
  - Place
  - Gender

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.

- Input variables :
  - Health (Character variable)
  - Age (integer)
  - Place (character)
  - Gender (character)

```c
#include<stdio.h>
int main()
{
    char health, gender, place;
    int age;
    printf("Enter Gender: M for male and F for female");
    scanf("%c",&gender);
    printf("\nEnter Health Status: E for excellent and P for poor");
    scanf(" %c",&health);
    printf("\nEnter Place: C for city and V for village");
    scanf(" %c",&place);
    printf("\nEnter age");
    scanf("%d",&age);
```

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.

```c
#include<stdio.h>
int main()
{
    char health, gender, place;
    int age;
    printf("Enter Gender: M for male and F for female");
    scanf("%c",&gender);
    printf("\nEnter Health Status: E for excellent and P for poor");
    scanf(" %c",&health);
    printf("\nEnter Place: C for city and V for village");
    scanf(" %c",&place);
    printf("\nEnter age");
    scanf("%d",&age);
    if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='M')
    printf("Premium is Rs. 4/1000 and 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.

```c
#include<stdio.h>
int main()
{
    char health, gender, place;
    int age;
    printf("Enter Gender: M for male and F for female");
    scanf("%c",&gender);
    printf("\nEnter Health Status: E for excellent and P for poor");
    scanf(" %c",&health);
    printf("\nEnter Place: C for city and V for village");
    scanf(" %c",&place);
    printf("\nEnter age");
    scanf("%d",&age);
    if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='M')
    printf("Premium is Rs. 4/1000 and policy amount cannot exceed Rs. 2 lakhs");
    else if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='F')
    printf("Premium is Rs. 3/1000 and 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.

```
#include<stdio.h>
int main()
{
    char health, gender, place;
    int age;
    printf("Enter Gender: M for male and F for female");
    scanf("%c",&gender);
    printf("\nEnter Health Status: E for excellent and P for poor");
    scanf(" %c",&health);
    printf("\nEnter Place: C for city and V for village");
    scanf(" %c",&place);
    printf("\nEnter age");
    scanf("%d",&age);
    if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='M')
    printf("Premium is Rs. 4/1000 and policy amount cannot exceed Rs. 2 lakhs");
    else if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='F')
    printf("Premium is Rs. 3/1000 and policy amount cannot exceed Rs. 1 lakh");
    else if(health=='P'&& (age>=25 && age<=35) && (place =='V') && gender=='M')
    printf("Premium is Rs. 6/1000 and policy amount cannot exceed Rs. 10,000");
```

In all other cases the person is not insured.

```c
#include<stdio.h>
int main()
{
    char health, gender, place;
    int age;
    printf("Enter Gender: M for male and F for female");
    scanf("%c",&gender);
    printf("\nEnter Health Status: E for excellent and P for poor");
    scanf(" %c",&health);
    printf("\nEnter Place: C for city and V for village");
    scanf(" %c",&place);
    printf("\nEnter age");
    scanf("%d",&age);
    if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='M')
    printf("Premium is Rs. 4/1000 and policy amount cannot exceed Rs. 2 lakhs");
    else if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='F')
    printf("Premium is Rs. 3/1000 and policy amount cannot exceed Rs. 1 lakh");
    else if(health=='P'&& (age>=25 && age<=35) && (place =='V') && gender=='M')
    printf("Premium is Rs. 6/1000 and policy amount cannot exceed Rs. 10,000");
    else
    printf("Person is not insured");
    return 0;
}
```

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.

```
if(health=='E'&& (age>=25 && age<=35) && (place =='C') && gender=='M')
printf("Premium is Rs. 4/1000 and policy amount cannot exceed Rs. 2 lakhs");
```

Better way to write

```
if((health=='E' || health=='e') && (age>=25 && age<=35) &&
    (place =='C'|| place == 'c')  && (gender=='M'|| gender=='m'))
printf("Premium is Rs. 4/1000 and policy amount cannot exceed Rs. 2 lakhs");
```

Exercise

- If cost price and selling price of an item is input through the keyboard, write a program to determine whether the seller has made profit or incurred loss. Also determine how much profit he made or loss he incurred.

- If SP > CP, then profit is given as
- **Profit = selling price (SP) – cost price (CP)**
- If SP < CP, then loss is given as
- **Loss = cost price (CP) – selling price (SP)**
- Loss and Profit can be calculated in percent also using the below formulas:
- Loss % = (Loss/Cost price) × 100
- Profit % = (Profit/Cost price) × 100

- What will be input variable ?
- What will be the condition to be tested?

- Given the coordinates **(x, y)** of a center of a circle and it’s radius, write a program which will determine whether a point lies inside the circle, on the circle or outside the circle.

The distance between $\langle x_c, y_c \rangle$ and $\langle x_p, y_p \rangle$ is given by the Pythagorean theorem as

$$d = \sqrt{(x_p - x_c)^2 + (y_p - y_c)^2} .$$

The point $\langle x_p, y_p \rangle$ is inside the circle if $d < r$, on the circle if $d = r$, and outside the circle if $d > r$. You can save yourself a little work by comparing d^2 with r^2 instead: the point is inside the circle if $d^2 < r^2$, on the circle if $d^2 = r^2$, and outside the circle if $d^2 > r^2$. Thus, you want to compare the number $(x_p - x_c)^2 + (y_p - y_c)^2$ with r^2.

```
#include<math.h>
 a = (xp-xc);
a = pow(a,2);
b = (yp-yc);
b = pow(b,2);
D = sqrt(a+b);
```

- What will be input variable ?
- What will be the condition to be tested?

Loops

- The versatility of the computer lies in its ability to perform a set of instructions repeatedly.
- There are three methods by way of which we can repeat a part of a program
  - Using a **for** statement
  - Using a **while** statement
  - Using a **do-while** statement

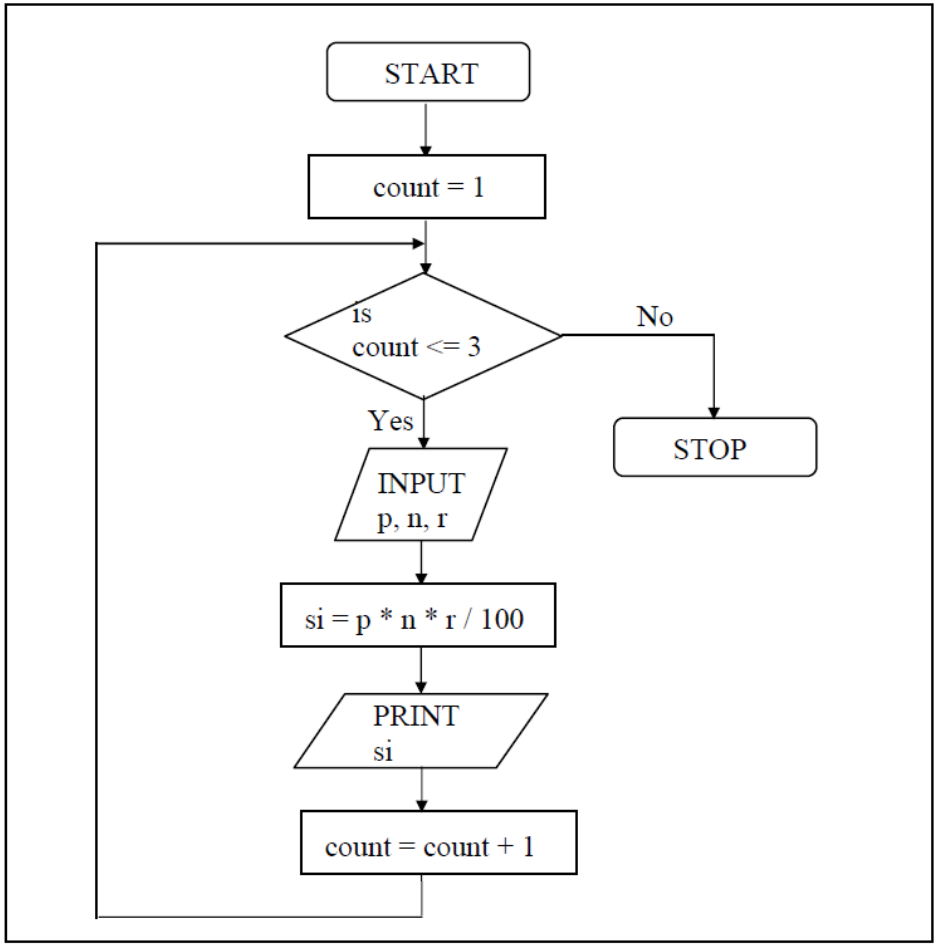
While loop

- You want to calculate gross salaries of ten different persons.

or

- You want to convert temperatures from centigrade to fahrenheit for 15 different cities

Calculation of simple interest for 3 sets of p, n and r

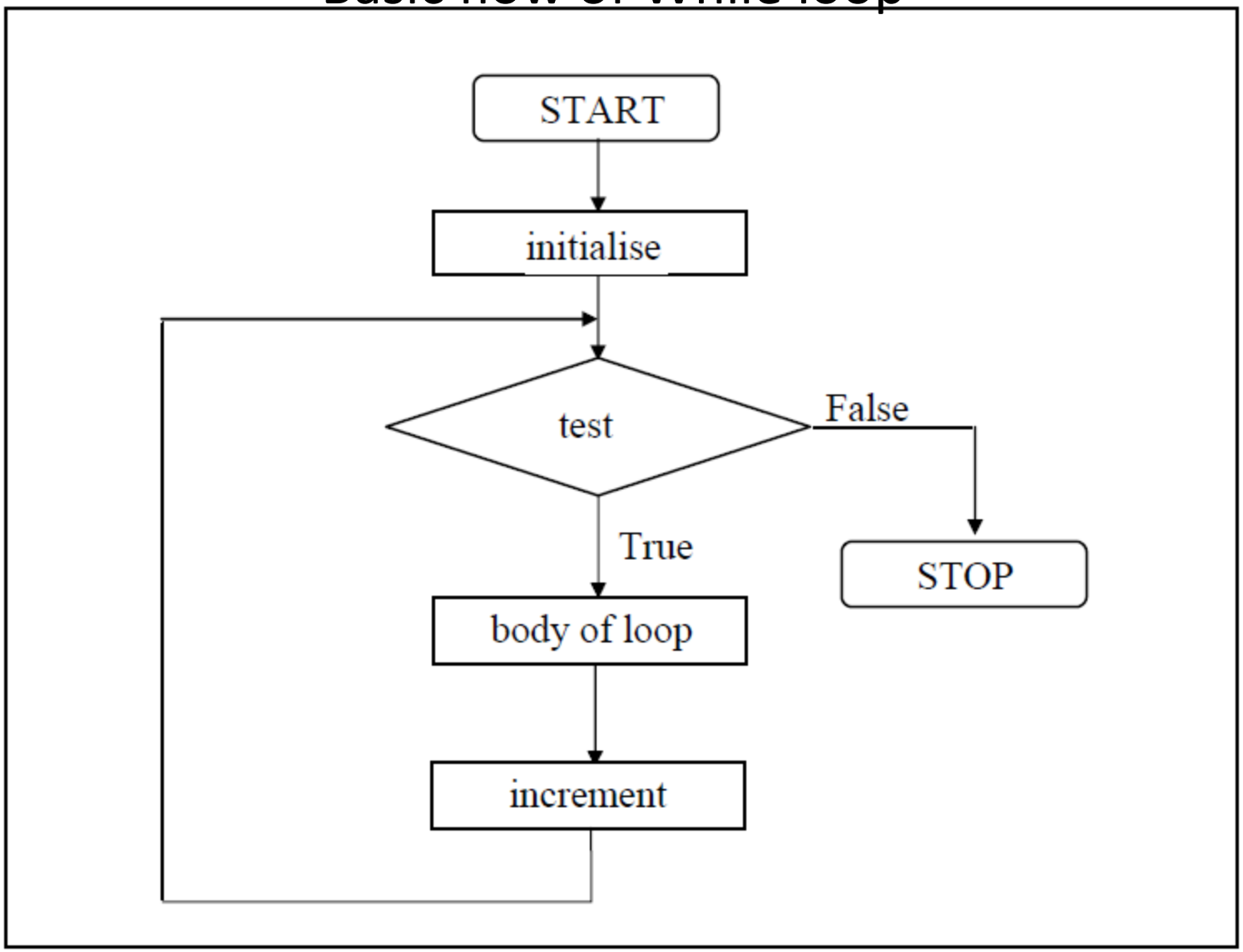


```
/* Calculation of simple interest for 3 sets of p, n and r */
main( )
{
      int   p, n, count ;
      float   r, si ;

      count = 1 ;
      while ( count <= 3 )
      {
            printf ( "\nEnter values of p, n and r " ) ;
            scanf ( "%d %d %f", &p, &n, &r ) ;
            si = p * n * r / 100 ;
            printf ( "Simple interest = Rs. %f", si ) ;

            count = count + 1 ;
      }
}
```

Output

```
Enter values of p, n and r  1000  5  13.5
Simple interest = Rs. 675.000000
Enter values of p, n and r  2000  5  13.5
Simple interest = Rs. 1350.000000
Enter values of p, n and r  3500  5  3.5
Simple interest = Rs. 612.500000
```

Basic flow of While loop



Tips and Traps

The general form of **while** is as shown below:

```
initialise loop counter ;
while ( test loop counter using a condition )
{
        do this ;
        and this ;
        increment loop counter ;
}
```

Following points about while

- The statements within the **while** loop would keep on getting executed till the condition being tested remains true.
- When the condition becomes false, the control passes to the first statement that follows the body of the **while** loop.
- In place of the condition there can be any other valid expression. So long as the expression evaluates to a non-zero value the statements within the loop would get executed.
- The condition being tested may use relational or logical operators as shown in the following examples:
  - while (i <= 10)
  - while (i >= 10 && j <= 15)
  - while (j > 10 &&(b < 15 || c < 20))

– The statements within the loop may be a single line or a block of statements. In the first case the parentheses are optional. For example,

```
while ( i <= 10 )
    i = i + 1 ;
```

is same as

```
while ( i <= 10 )
{
    i = i + 1 ;
}
```

– As a rule the while must test a condition that will eventually become false, otherwise the loop would be executed forever, indefinitely.

```
main( )
{
    int  i = 1 ;
    while ( i <= 10 )
        printf ( "%d\n", i ) ;
}
```

– Instead of incrementing a loop counter, we can even decrement it and still manage to get the body of the loop executed repeatedly. This is shown below:

```
main( )
{
    int   i = 5 ;
    while ( i >= 1 )
    {
        printf ( "\nMake the computer literate!" ) ;
        i = i - 1 ;
    }
}
```

– It is not necessary that a loop counter must only be an int. It can even be a float.

```
main( )
{
    float   a = 10.0 ;
    while ( a <= 10.5 )
    {
        printf ( "\nRaindrops on roses..." ) ;
        printf ( "...and whiskers on kittens" ) ;
        a = a + 0.1 ;
     }
 }
```