3.34 Rewrite the following if statements using the conditional operator

```
if (ages >= 16)
        ticketPrice = 20;
else
        ticketPrice = 10;
```

ANS:

```
TicketPrice=(ages>=16)?20:10;
```

3.35 Rewrite the following conditional expressions using if-else statements.

a. score = (x > 10) ? 3 * scale : 4 * scale;

b. tax = (income > 10000) ? income * 0.2 : income * 0.17 + 1000;

c. System.out.println((number % 3 == 0) ? i : j);

ANS:

a.
```
If (x > 10){
score = 3 * scale ;
}else{
score = 4 * scale;
}
```

b.
```
If (income > 10000){
income = income * 0.2;
}else{
income = income * 0.17 + 1000;
}
```

c.
```
if(number % 3 == 0){
   System.out.println (I);
}else{
    System.out.println (J);
}
```

***3.17 (Game: scissor, rock, paper) Write a program that plays the popular scissor-rock-paper game.** (A scissor can cut a paper, a rock can knock a scissor, and a paper can wrap a rock.) The program randomly generates a number 0, 1, or 2 representing scissor, rock, and paper. The program prompts the user to enter a number 0, 1, or 2 and displays a message indicating whether the user or the computer wins, loses, or draws. Here are sample runs:

```
scissor (0), rock (1), paper (2): 1 The computer is scissor. You are rock. You won
scissor (0), rock (1), paper (2): 2 The computer is paper. You are paper too. It is a draw
Programming
```

ANS:

```
package scissorrockpapergame;
import java.util.*;
public class ScissorRockPaperGame {
   public static void main(String[] args) {
   Scanner input = new Scanner(System.in);
   int computer = (int)(Math.random()*3);
   System.out.print("scissor(0),rock(1),paper(2): ");
   int player = input.nextInt();
   switch (computer){
      case 0 : System.out.print("The computer is scissor. ");break;
      case 1 : System.out.print("The computer is rock. ");break;
      case 2 : System.out.print("The computer is paper. ");break;
   }
   switch(player){
      case 0 : if(computer == 2){
                  System.out.print("You are Scessor. You win\n");
               }else{
               if(computer == 1){
                  System.out.print("You are Scessor. You lose\n");
               }else{
               System.out.print("You are Scessor too. It is a draw\n");
               }};break;
      case 1 :  if(computer == 0){
                  System.out.print("You are rock. You win\n");
               }else{
               if(computer == 2){
                  System.out.print("You are rock. You lose\n");
               }else{
               System.out.print("You are rock too. It is a draw\n");
               }};break;
      case 2 :  if(computer == 1){
                  System.out.print("You are paper. You win\n");
               }else{
               if(computer == 0){
                  System.out.print("You are paper. You lose\n");
               }else{
               System.out.print("You are paper too. It is a draw\n");
               }};break;
    }
    }
}
```

****3.21 (Science: day of the week) Zeller's congruence is an algorithm developed by Christian Zeller to calculate the day of the week.**

The formula is:

$$h = \left(q + \frac{26(m+1)}{10} + k + \frac{k}{4} + \frac{j}{4} + 5j\right) \% 7$$

where

■ h is the day of the week (0: Saturday, 1: Sunday, 2: Monday, 3: Tuesday, 4: Wednesday, 5: Thursday, 6: Friday).

■ q is the day of the month.

■ m is the month (3: March, 4: April, ···, 12: December). January and February are counted as months 13 and 14 of the previous year.

■ j is the century

(i.e., $\frac{year}{100}$).

■ k is the year of the century (i.e., year % 100).

Note that the division in the formula performs an integer division. Write a program that prompts the user to enter a year, month, and day of the month, and displays the name of the day of the week. Here are some sample runs:

```
Enter year: (e.g., 2012): 2015
Enter month: 1-12: 1
Enter the day of the month: 1-31: 25
Day of the week is Sunday
```

```
Enter year: (e.g., 2012): 2012
Enter month: 1-12: 5
Enter the day of the month: 1-31: 12
Day of the week is Saturday
```

(Hint: January and February are counted as 13 and 14 in the formula, so you need to convert the user input 1 to 13 and 2 to 14 for the month and change the year to the previous year.)

ANS:

```
package dayoftheweek;

import java.util.*;
public class DayOfTheWeek {

static void main(String[] args) {
      Scanner input = new Scanner(System.in);
      int h,q,m,j,k,year;
      System.out.print("Enter year: (e.g., 2012): ");
      year = input.nextInt();
      System.out.print("Enter month: 1-12: ");
      m = input.nextInt();
      System.out.print("Enter the day of the month: 1-31: ");
      q = input.nextInt();
      if(m == 1 || m == 2){
         m = m + 12;
         year = year - 1;
      }
      j = (year/100);
      k = (year % 100);
      h = (q+(26*(m+1)/10)+k+(k/4)+(j/4)+(5*j))%7;
      switch(h){
         case 0 : System.out.print("Day of the week is Saturday");break;
         case 1 : System.out.print("Day of the week is Sunday");break;
         case 2 : System.out.print("Day of the week is Monday");break;
         case 3 : System.out.print("Day of the week is Tuesday");break;
         case 4 : System.out.print("Day of the week is Wendensday");break;
         case 5 : System.out.print("Day of the week is Thursday");break;
         case 6 : System.out.print("Day of the week is Friday");break;
      }
   }

}
```

***3.33 (Financial: compare costs) Suppose you shop for rice in two different packages. You would like to write a program to compare the cost.** The program prompts the user to enter the weight and price of each package and displays the one with the better price.

Here is a sample run:

```
Enter weight and price for package 1: 50 24.59
Enter weight and price for package 2: 25 11.99
Package 2 has a better price.
```

ANS:

```
package comparecost;

import java.util.*;
public class CompareCost {

   public static void main(String[] args) {
      Scanner input = new Scanner(System.in);
      double weight1,price1,weight2,price2,betterPrice;
      System.out.print("Enter weight and price for package 1: ");
      weight1 = input.nextDouble();
      price1 = input.nextDouble();
      System.out.print("Enter weight and price for package 2: ");
      weight2 = input.nextDouble();
      price2 = input.nextDouble();
      if(price1 > price2){
         System.out.println("Package 2 has a better price.");
      }else{
         System.out.println("Package 1 has a better price.");
      }
   }
}
```