King Saud University
College of Computer & Information Science
CSC111 – Assignment 4
All Sections

Question 1

Write a program that prompts the user to enter an integer and determines whether it is divisible by 5 and 6, whether it is divisible by 5 or 6, and whether it is divisible by 5 or 6, but not both. Here is a sample run of this program:

Use class name Divisible

Here is a sample run:

```
Enter an integer: 10 ↵
Is 10 divisible by 5 and 6? false
Is 10 divisible by 5 or 6? true
Is 10 divisible by 5 or 6, but not both? true
```

Question 2

A shipping company uses the following function to calculate the cost (in dollars) of shipping based on the weight of the package (in pounds).

$$c(w) = \begin{cases} 3.5, \text{if } 0 < w <= 1 \\ 5.5, \text{if } 1 < w <= 3 \\ 8.5, \text{if } 3 < w <= 10 \\ 10.5, \text{if } 10 < w <= 20 \end{cases}$$

Write a program that prompts the user to enter the weight of the package and display the shipping cost. If the weight is greater than 20, display a message "**the package cannot be shipped.**"

Use class name Shipping

Here is a sample run:

```
Enter package weight:  10
The shipping  cost is $8.5
```

Question 3

Write a program that reads three edges for a triangle and computes the perimeter if the input is valid. Otherwise, display that the input is invalid. The input is valid if the sum of every pair of two edges is greater than the remaining edge.

Use class name Triangle

Sample Run

```
Enter three edges (length in double): 4 5 6
The perimeter is 15.0
```

Sample Run 2

```
Enter three edges (length in double): 1 3 5
Input is invalid
```

Question 4

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., *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.

Use class name Day.

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.)