**Name: Session:**

**Programming II**

**Lab Exercise 4/21/2021**

In this activity you may create either a Console Application or a Windows Form Application. When you have completed these applications, submit your source code as well as a screen shot of your running application.

1. The Wicks Corporation manufactures a line of 14 different waxes for cross-country skiing. Because many of their customers have a difficult time selecting the proper wax to use, the company has decided to sell a hand-held computer to aid in the selection. You have been hired to write the program for this computer. Wax choice depends on temperature and snow conditions. The waxes come in various degrees of hardness that are divided into six color groups. A skier selects a wax color on the basis of temperature. All of the color groups except Yellow and White have three varieties (Special, Standard, and Extra) to account for variations in snow conditions (Powder, Firm, and Crusty).  Your program should accept as input the current temperature and snow condition. Then compute and print out the most appropriate wax.  The temperature and snow condition guidelines are shown below.

**Temperature Guidelines** (used to select a wax group)

*Wax Group         Temperature*

Yellow         38 < Temp

Red            31 < Temp <= 38

Violet         26 < Temp <= 31

Blue           18 < Temp <= 26

Green           5 < Temp <= 18

White               Temp <= 5

**Snow Condition Guidelines** (used to select a variety for waxes other than the extreme - temperature waxes (Yellow and White).

*Wax Variety         Snow Conditions*

Special                    Powder

Standard                 Firm

Extra                      Crusty

**Inputs**

Temperature, the current temperature, an integer.   
Valid range: -50 < Temperature < 100

Snow, the current snow condition.   
Powder, Firm, Crusty

**Outputs**

Temperature and snow condition.   
The wax variety.   
The wax color.  
An error message if the input data is invalid.

**Functions**

Get the temperature and snow condition.

Determine wax color (given the temperature) using the temperature guidelines table above.

Determine was variety (given the snow conditions) using the snow conditions guidelines table above.

Print the wax variety and the wax color.  
  
Print "Invalid input" if either the temperature or snow conditions are invalid.

**Sample Execution:**

Enter the current temperature: 35

Enter the snow conditions (P=powder, F=firm, C=Crusty): P

The best wax is: Special Red

1. Old bones and artifacts can be dated using a technique known as radioactive dating. When an artifact is created, it contains some amount of material (e.g., carbon 14) which emits radioactive particles. Over time, the radioactive substance decays and emits particles more and more slowly. The amount of radioactive material never reaches zero, it just reduces geometrically. The amount of time it takes for the rate of radioactive particle emissions to cut in half is constant and is known as the half-life. By knowing the half-life and the initial emissions rate, and measuring the current emissions rate, the age of an artifact can be computed. For example, if the half-life of the radioactive substance is 3 years and the emissions rate was initially 16 and is now 4, then the emissions rate has been cut in half twice, so the artifact must be two half-lives old, or 6 years old.

Equation for calculating age

 

Input Format

Each line of input contains three real numbers, h, i and c describing an artifact.

h > 0 is the known half-life of the radioactive substance in years, i > 0 is the known initial emissions rate, and 0 < c ≤ i is the measured current emissions rate.

Output Format

For each artifact, compute and output the age of the artifact in years.

Input Sample

3.0 16.0 4.0

25.0 1000.0 1.0

10.0 58.0 0.01

1.0 8.0 1.0

1000.0 25500.0 0.00002

Output Sample

Age: 6.00 years

Age: 249.14 years

Age: 125.02 years

Age: 3.00 years

Age: 30247.85 years