

CITC-1301 Introduction to Programming

Chapter 3 Exercises

Exercise 1: Age Classifier

Write a Python program that asks the user to enter a person's age. The program shall display a message indicating whether the person is an infant, a child, a teenager, or an adult.

Use the following guidelines:

- If the person is 1 year old or less, he or she is an infant.
- If the person is older than 1 year, but younger than 13 years, he or she is a child.
- If the person is at least 13 years old, but less than 18 years old, he or she is a teenager.
- If the person is at least 18 years old, he or she is an adult.

Example output:

```
This program determines if a person is an infant, a child, a teenager, or an adult.  
  
Person's age: 37 [ENTER]  
  
37-year-old person is an adult.
```

Exercise 2: "Magic" Dates

The date June 10, 1960, is special because when we write in the following format, the month times the day equals the year:

6/10/60

Write a program that asks the user to enter a month (in numeric form), a day, and a two-digit year. The program shall then determine whether the month multiplied by the day is equal to the year. If so, display a message informing the user the date is "magic." Otherwise, it should display a message saying the date is not magic.

Example output:

```
This program determines if a date is "magic."  
  
Enter a month: 4 [ENTER]  
Enter a day: 17 [ENTER]  
Enter a year: 82 [ENTER]  
  
The date 4/17/82 is not a magic date.
```

```
This program determines if a date is "magic."  
  
Enter a month: 10 [ENTER]  
Enter a day: 6 [ENTER]  
Enter a year: 60 [ENTER]  
  
The date 10/6/60 is a magic date!
```

Exercise 3: Money Counting Game

Create a change-counting game that asks the user to enter the number of coins required to make exactly one dollar. The program shall prompt the user to enter a number of pennies, nickels, dimes, and quarters. If the total value of the coins entered is equal to \$1, the program shall congratulate the user for winning the game. Otherwise, the program shall display a message indicating whether the amount entered was more than or less than \$1.

Example output:

```
Money Counting Game

Enter a number of coins to make exactly $1.

Number of pennies: 5 [ENTER]
Number of nickels: 5 [ENTER]
Number of dimes: 2 [ENTER]
Number of quarters: 2 [ENTER]

Congratulations! You won the game.
```

```
Money Counting Game

Enter a number of coins to make exactly $1.

Number of pennies: 50 [ENTER]
Number of nickels: 12 [ENTER]
Number of dimes: 0 [ENTER]
Number of quarters: 0 [ENTER]

You lost. You are 0.10¢ over.
```

Exercise 4: Body Mass Index

Write a Python program that calculates and displays a person's body mass index (BMI). The BMI is often used to determine whether a person is overweight or underweight for their height. A person's BMI is calculated with the following formula:

$$BMI = weight \times 703 / height^2$$

Weight is measured in pounds and *height* is measured in inches. The program shall ask the user to enter their weight and height, then display the user's BMI. The program shall also display a message indicating whether the person has optimal weight, is underweight, or is overweight.

A person's weight is considered...

- Underweight if their BMI is less than 18.5
- Optimal if their BMI is between 18.5 and 25
- Overweight if their BMI is greater than 25

Example output:

```
This program calculates a person's BMI.

Weight (in pounds): 175 [ENTER]
Height (in inches): 72 [ENTER]

A person who weighs 175lbs and is 6'0" tall has a BMI of 23.7.
This person's weight is optimal.
```

Exercise 5: Time Calculator

Write a Python program that asks the user to enter a number of seconds and works as follows:

- There are 60 seconds in a minute. If the number of seconds entered by the user is greater than or equal to 60, the program shall convert the number of seconds to minutes and seconds.
- There are 3,600 seconds in an hour. If the number of seconds entered by the user is greater than or equal to 3,600, the program shall convert the number of seconds to hours, minutes, and seconds.
- There are 86,400 seconds in a day. If the number of seconds entered by the user is greater than or equal to 86,400, the program shall convert the number of seconds to days, hours, minutes, and seconds.

Example output:

```
Time Calculator.  
  
Enter a number of seconds: 100000 [ENTER]  
  
100,000 sec. is 1 day, 3 hr., 46 min., 40 sec.
```