

Chapter 4 Review Questions

1. Decision structures determine the statements that execute based upon a _____.
2. A _____ result is one that is either true or false.
3. The Flow of Control refers to the _____ in which statements will execute.
4. In a Flowchart, decisions are represented by _____.
5. Statements that execute when an “*if*” condition is true are below the condition and _____.
6. When multiple statements are associated with an “*if*” condition, they are referred to as a _____ of code.
7. Boolean expressions are implemented using _____ operators.
8. In an *if-else* statement, when the “*if*” condition is false the _____ clause will execute.
9. An “*if*” conditional statement that directly follows another “*if*” conditional statement is referred to as a _____ if.
10. When two strings are compared for equivalence, the _____ value of each character is compared individually.
11. Compound Boolean expressions are implemented using the _____ operators.
12. For a compound expression that uses a logical “*and*” to be true, _____ of the conditions must be true.
13. For a compound expression that uses a logical “*or*” to be true _____ of the conditions must be true.
14. The logical operator that is used to negate a Boolean value is the _____ operator.
15. Boolean variables can only be assigned a status of _____ or _____.
16. Boolean variables are often used as _____ in code.

Chapter 4 Short Answer Exercises

1. What do the following lines of code output if *var1* = 6, and *var2* = 8?

```
if var2 > var1:  
    print('var2 is greater')
```

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2. What do the following lines of code output if *var1* = 6, and *var2* = 8?

```
if var1 >= var2:
    print('var2 is greater')
```

3. What do the following lines of code output if *var1* = 6, and *var2* = 8?

```
if var1 <= var2:
    var3 = var1 + var2
    print('var3 is', var3)
```

4. What do the following lines of code output if *var1* = 6, and *var2* = 8?

```
if var1 == var2:
    print('They are the same')
print('They are not the same')
```

5. What do the following lines of code output if *first* = 10, and *second* = 10?

```
if first == second:
    print('They are the same')
print('They are not the same')
```

6. What do the following lines of code output if *first* = 10, and *second* = 10?

```
if first > second:
    print('first is greater')
else:
    print('second is greater')
```

7. What do the following lines of code output if *val1* = 3, *val2* = 5, and *val3* = 8

```
if val2 > val1:
    val3 = val2 - val1
elif val3 > val2:
    val3 = val2
else:
    val3 = 99
print('val3 is', val3)
```

8. Write the word Python using the Base-10 digits for the letters (ref. Appendix A).

9. Are the following string relationships True or False?

a. Many > Mare

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- b. `Tent > Tens`
 - c. `dress == Dress`
 - d. `Cod != cod`
 - e. `python >= python`
10. Are following expressions true or false if *first* = true and *second* = false?
- a. `first and second`
 - b. `first or second`
 - c. `second or first`
 - d. `second and first`
 - e. `!first`
 - f. `!second`
11. Write an “if” conditional expression using a logical operator that tests for a number that is greater than 32 and less than 120.
12. Write an “if” conditional expression using a logical operator that tests for a number between 0 and 50, including 50 but excluding 0.
13. True or false, the following expressions test for the same condition.
- `if num > 9 and num < 21` `if num >= 10 and num <= 20`
14. What range of numbers assigned to num would make the following expression true?
- `if num > 0 or num < 100`
15. What range of numbers assigned to num would make the following expression true?
- `if num > 0 and num > 100`
16. What numbers are excluded by the following expression?
- `if num < 0 or num > 0`
17. What value assigned to done would execute the print statement?
- if done:
 `print("That's all")`

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1. Write a program that accepts an integer as input and displays whether or not it is greater than zero.
2. Write a program that accepts an integer as input and displays whether it is positive, negative, or zero.
3. Write a program that accepts an integer as input for the number of hours worked and executes the following algorithm. If the number of hours worked are greater than 40, then output "There is overtime", otherwise output "There is no overtime".
4. Expansion of the program in #3. Draw a flowchart of the algorithm and write a program that implements the following pseudocode. Consider each variable that is needed, the order of operations, and formatting of the output for dollar amounts. Design the solution in terms of input, processing, and then output.

Get the number of hours worked

Get the hourly rate of pay

Compute regular pay as hourly rate * hours up to and including 40
if the number of hours worked > 40

– compute overtime pay at 1.5 * hourly rate for hours > 40

Output regular pay

Output overtime pay

Output total pay

Sample output

```
Enter hours worked 41
Enter hourly rate $10.00

Regular pay is $ 400.00
Overtime pay is $ 15.00
Total pay is $ 415.00
```

5. Modify program #4 to include double time pay (2 * hourly rate) for hours above 50, and add the additional output for the double time pay. The hours from 41 to 50 remain time-and-a-half pay (1.5 * hourly rate). Sample output is shown below.

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```
Enter hours worked 51
Enter hourly rate $10.00

Regular pay is $ 400.00
Overtime 1.5x pay is $ 150.00
Overtime at 2x pay is $ 20.00
Total pay is $ 570.00
```

6. Write a program that requests two words from the user and sorts them alphabetically based on relational operators. Display the words in the correct order, or if the same word is entered twice, output "They are the same".
7. Write a program that requests a *username* and *password* from the user, and then requests that they confirm the password. If the passwords match, output "account has been created for" and the *username*, otherwise output "Invalid password confirmation".
8. Write a store program that accepts the price for an item and computes a discounted price based on the criteria below, determines the 7% sales tax amount, and display the original price, discounted price, sales tax, and the total amount for the purchase. Right align the dollar amounts as shown in the sample output below.

Discount criteria

```
Greater than $100.00 - 27%
Greater than $90.00 - 22%
Greater than $80.00 - 16%
Greater than $60.00 - 8%
```

Sample output

```
Enter the price of the item 102.56

Original price $ 102.56
Discount price $  74.87
Tax           $   5.24
Total amount  $  80.11
```

9. Write a program that prompts the user to enter a temperature and then "F or f" or "C or c" if it is a Fahrenheit or Celsius temperature to convert. Display both of the temperatures or "Cannot convert" if an incorrect letter was entered. The equations for the conversions are:

$$C = (F - 32) / 1.8$$

$$F = (C * 1.8) + 32$$

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10. A Theater manager has requested a program that computes the total sales receipts and profit for an event based on the number of tickets sold and the following criteria:

- The 200 main floor tickets are sold first, and then the 75 balcony tickets are sold once the main floor is sold out.
- Main floor tickets are \$29.50 each
- Balcony tickets are \$19.50 each.
- The program will request the total number of tickets sold and "M" for Matinee or "E" for evening. The cost to hold an event is \$1,200.00 for Matinee and \$1,450.00 for evening.
- The output will include the number of tickets sold and sales for each section, the total sales receipts, the event cost, and the profit for the event.

#10 (a) Write the pseudocode for the program

#10 (b) Draw a flowchart of the solution

#10 (c) Develop the program

Sample output A

```
Enter the number of tickets sold 199
Enter "M: for Matinee or "E" for Evening e

Main Floor tickets sold 199 - sales: $ 5870.50
Balcony tickets sold 0 - sales: $ 0.00
Total sales : $ 5870.50
Event cost: $ 1450.00
Profit from the event: $ 4420.50
```

Sample output B

```
Enter the number of tickets sold 201
Enter "M: for Matinee or "E" for Evening M

Main Floor tickets sold 200 - sales: $ 5900.00
Balcony tickets sold 1 - sales: $ 19.50
Total sales : $ 5919.50
Event cost: $ 1200.00
Profit from the event: $ 4719.50
```

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11. The wind chill in North America is computed using temperature in Fahrenheit and wind speed in miles-per-hour, however it is not valid for temperatures above 50 degrees or when the wind speed is 3.0 mph or less. Write a program that requests the temperature and wind speed, and computes the wind chill or displays that it is not valid and the particular reason that is not valid.

The equation for approximating the wind chill factor in North America is:

$$wc = 35.74 + 0.6215 T_a - 35.75V^{+0.16} + 0.4275 T_a V^{+0.16}$$

Where T_a is the air temperature in Fahrenheit, and

V is the wind speed in mph

Chapter 4 Programming Challenge

Planet-days to Earth-days

Write a program that compares Planet-days to earth-days for planets listed below. The program will:

- Request the name of the planet and a number of Earth-days
- Validate that the input is one of the planets listed
- Validate that the number of days is greater than zero
- Compute and display the number of planet-days that would pass on the chosen planet based upon the conversion values in hours provided (NASA).

The output should be formatted to three (3) decimal places

<u>Planet</u>	<u>Earth Equivalent Hours</u>
Earth	24.0 hours
Mercury	4222.6 hours
Venus	2802.0 hours
Mars	24.7 hours

Sample output A

```
Enter the name of the planet
Mercury, Venus, or Mars Mars
Enter the number of days to compare 5
```

```
5.0 Earth-days is equivalent to 4.858 days on Mars
```

Sample output B

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Enter the name of the planet

Mercury, Venus, or Mars Venus

Enter the number of days to compare 5

5.0 Earth-days is equivalent to 0.043 days on Venus