

Variables, Expressions, and Statements

Instructions

- Complete this lab report during the lab period on Wednesday or hand in your completed report on Thursday prior to class at 9:30am. The two programming exercises described in sections III and IV of this handout should be submitted through Sakai's Assignment link before class on Thursday.
- Program files submitted through the Sakai Assignment page must use the following naming format:
 - Lastname_Firstinitial_Lab_lab#_problem#.py
 - For example, for Lab #2, problem #3, my file would be named: *Thomas_S_Lab_2_3.py*
- All programming assignments must follow the Style Guide and include meaningful comments.

I. One formula for calculating Body Mass Index (BMI) is:

$$703 \times \text{Weight in Pounds} / \text{Height in Inches}^2$$

Common values are in the range 15-35. The following program is an attempt to implement the BMI formula in Python (the preamble has been omitted to save space). Copy and paste the code into Pyscripter and debug it. Find, identify, and correct two errors.

```
# Prompt the user to enter weight in pounds
weight = eval(input("Enter your weight in pounds: "))

# Prompt the user to enter height in inches
height = input("Enter your height in inches: ")

bmi = 703 * weight / height * height

print("Your BMI is", bmi)
```

a. Describe an error and how you fixed it. Was this a syntax/runtime/semantic error?

b. Describe an error and how you fixed it. Was this a syntax/runtime/semantic error?

c. After you correct the program what do you get as the BMI for a weight of 120 pounds and a height of 64 inches? _____

- II. The following program reads an integer between 0 and 999 (the preamble has been omitted to save space). It adds up the digits in the integer and prints the sum. For example, if the user types 123, the program should print 6. But it contains errors. Copy the code into Pyscripter and debug it. Find, identify, and correct two errors.

```
# Prompt the user to enter a number
number = eval(input("Enter an integer from 0 and 999: "))
remainder = number

thirdDigit = remainder % 10
remainder = remainder // 10

middleDigit = remainder % 10
remainder = remainder // 10

firstDigit = remainder % 10

# Compute the sum of all digits
sum = thirdDigit + middleDigit + firstDigit

# Display results
print("The sum of all the digits in", number, "is", sum)
```

a. Describe an error and how you fixed it. Was this a syntax/runtime/semantic error?

b. Describe an error and how you fixed it. Was this a syntax/runtime/semantic error?

c. After you correct the program what do you get as the sum of the digits of:

975 _____ 100 _____ 10 _____ 1 _____ 0 _____

- III. According to Wikipedia, in the US, the perceived temperature due to wind chill can be calculated by the following formula:

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

where T_{wc} is the wind chill index, based on the Fahrenheit scale, T_a is the air temperature, measured in °F, and V is the wind speed, in mph.

We need a program that will prompt and read the air temperature in Fahrenheit as well as a wind speed in MPH and will compute the temperature with wind chill.

- Print out, with appropriate labels, the values of all variables, including the wind chill temperature.
- Run the program with the following inputs: air temperature of 50° F and wind speed of 30 mph. Record the temperature with wind chill to two decimal places: _____
- When complete, save your program and submit it through Sakai Assignment. Remember to name the file using the naming convention: Lastname_Firstinitial_Lab_2_3.py

- IV. This exercise is based on Exercise 7 from the text section on Python Data. The formula for computing the amount of money that will accumulate when receiving compound interest is:

$$\text{Amount} = P (1 + r/n)^{nt}$$

where P is the initial investment, r is the annual interest rate (as a decimal value), n is the number of times the interest is compounded each year and t is the number of years. Write a program that will allow the user to type in the values of the Principal, the interest rate, the number of times the interest is compounded per year and the number of years, as follows:

- Prompt the user for the principal (assume US dollars) and the rate. The rate should be entered as a percentage and not a decimal. That is, for 5% the user should enter 5 not .05. The program must account for this by converting the interest rate to a decimal value. Prompt the user for the value of n and the value of t , the number of years.
- Print out, with appropriate labels, the values of all variables, including the final amount.
- Run the program with the following: Principal of \$100,000; interest rate of = 6%; $n = 365$ (compounded daily); $t = 10$ years. Record the amount calculated to two decimal places: _____
- When complete, save your program and submit it through Sakai Assignment. Remember to name the file using the naming convention: Lastname_Firstinitial_Lab_2_4.py