UniSA STEM

COMP 1039 Problem Solving and Programming

Practical 2

Python Standard Library, standard input and output and if statements

Please make sure you have completed Practical 1 before continuing with Practical 2.

Internal Students

Login to the computer using your username and password.
   a) Type in your user name in lowercase (this is your UNINET username – e.g. bondj007).
   b) You will then be asked to enter your UNINET password.

External Students

Please ensure that Python is installed on your home computer. See the 'Resources' page on the course website for information on installing Python.

For all exercises in this practical, please use the editor which is part of the IDLE environment in order to create, save and run your programs (just like we did in practical 1). Please refer to practical 1 for a refresher if you have forgotten how! ☺

1. Create a file in order to complete this exercise (refer to practical 1 or ask your supervisor if you are having problems doing so). Write Python statements that (Modified: Gaddis, Tony. Algorithm Workbench, Chapter 2):
   a. Prompts the user to enter his or her favourite colour and assigns the user's input to a variable named colour. Display an appropriate message to the screen, for example: 'That's a lovely colour!', etc.
   b. Prompts the user to enter his or her favourite football team and assigns the user's input to a variable named team. Display an appropriate message to the screen, for example: 'That's my favourite team too!', etc.
   c. Prompts the user to enter his or her favourite drink and assigns the user's input to a variable named drink. Display an appropriate message to the screen, for example: 'Better not have too many!', etc.

2. Create a file in order to complete this exercise (refer to practical 1 or ask your supervisor if you are having problems doing so).

As seen below, your file should include appropriate comments consisting of the following – file name, your details, and date, brief program description and the University's academic misconduct statement. **All practical and assignment work you produce in this course should have the following comments.**

```
#
# File:      practical2ex2.py
# Author:    your name
# Email Id:  your email id
# Description:  Practical 2, exercise 2.
#   This is my own work as defined by the University's
#   Academic Misconduct policy.
#
```

Enter the following statements (from your slides) in a file and run it. **Do not use the Python shell, create a file in order to complete this exercise.**

```
width = 10
height = 5
width * height
```

You will notice that running the above does not produce any output. Let's fix this by doing the following:
1. Define a variable called area to store the result of width * height (i.e. area = width * height).
2. Add a print() statement in order to display the area to the screen as follows:
   The area is: 50

Let's make the above program flexible by allowing the user to enter a width and height instead of having them fixed to the values 10 and 5. Prompt for and read the width and height using the input() function. (Hint: you will also need to use the int() function). Refer to week 2 slides if you are needing help with this question.

3. Create a file in order to complete this exercise. Write a program which asks the user for three numbers as seen below (hint: you will need to use the input() and int() functions), adds the three numbers together and displays their total to the screen (hint: you will need to use the print() function).

Your output should be presented as follows (user input appears in bold):

```
Please enter number 1: 3
Please enter number 2: 7
Please enter number 3: 5
The sum is: 15
```

4. Create a file in order to complete this exercise. Many games require a player to roll two dice. The number on each die can vary from 1 to 6.

    a.   Use the `random.randint()` function to create a simulation of one roll of one die. Store the result in a variable called `die1`. (hint: remember to place `import random` at the top of your file so that you may make use of the randint() function).

    b.   Repeat part a. to create a simulation of the value rolled with a second die. Store the result in a variable called `die2`.

    c.   Add your two results to create a value representing the total rolled during each turn.

    d.   Display the results to the screen using the print() function.

5. Create a file in order to complete this exercise. Write a program that prompts the user to enter a number (integer) and displays the square of the number with appropriate text (to describe the output) to the screen.

6. The area of a circle is calculated as follows: area = PI * radius**2. Write a program that prompts the user to enter a radius, calculates the area of a circle and displays the area to the screen (with appropriate text). Refer to practical 1 solution if you are needing help with this exercise. Create a file in order to complete this exercise.

7. Create a file in order to complete this exercise. Write a program that asks the user for the number of males and the number of females enrolled in your practical class. The program should display the percentage of males and females in the class. (Hint: suppose there are 8 males and 12 females in a class. There are 20 students in the class. The percentage of males can be calculated as 8 / 20 = 0.4 or 40%. The percentage of females can be calculated as 12 / 20 = 0.6 or 60%.
(Modified: Gaddis, Tony. Programming Exercises, Chapter 2).

8. Create a file in order to complete this exercise. Write a program that prompts the user enter a price (dollar amount) and a percentage discount. Calculate and display the new price with discount.
Your output should be presented as follows (user input appears in bold to differentiate it from text that is displayed to the screen by the program):

                  Example 1:

```
Please enter price in dollars: 100.00
Please enter percent discount: 0.25
Price with discount is:   75.0
```

                  Example 2:

```
Please enter price in dollars: 25.0
Please enter percent discount: 0.10
Price with discount is:   22.5
```

Checkpoint: Please make sure your supervisor sees both your program output and code.

9. Create a file in order to complete this exercise. Write a program that prompts the user to enter a number representing the speed a car is travelling. If the speed is greater than or equal to 65, display the message 'Too fast – Fine!', otherwise, display the message 'No fine'. Hint: you will need to use an if statement to do this.

10. Create a file in order to complete this exercise. Write a program that prompts for a number (integer) and displays a message to say whether it is even or not (a number is even if its remainder when divided by 2 is zero). Hint: you will need to use an if statement to do this.

11. Create a file in order to complete this exercise. Many solid-fuel rocket motors consist of three stages. Once the first stage burns out, it separates from the missile and the second stage lights. Then the second stage burns out and separates, and the third stage lights. Finally, once the third stage burns out, it also separates from the missile. Assume that the following data approximately represent the times during which each stage burns:

        Stage 1: 0-100 seconds
        Stage 2: 100-170 seconds
        Stage 3: 170-260 seconds

Write a program to prompt for and read the time in seconds and determine whether the missile is in Stage 1 flight, Stage 2 flight, Stage 3 flight, or free flight (unpowered). Hint: you will need to use an if statement to do this.

12. Create a file in order to complete this exercise. Write a program that prompts the user to enter a temperature. If the temperature is greater than or equal to 40 degrees, display the message 'Way too hot – stay inside!', if the temperature is greater than or equal to 30 degrees, display the message 'Hot – beach time!', if the temperature is greater than or equal to 20 degrees, display the message 'Lovely day – how about a picnic!?!', if the temperature is greater than or equal to 10 degrees, display the message 'On the cold side – better take a jacket!', if the temperature is less than 10 degrees, display the message 'Way too cold – stoke up the fire!'. Hint: you will need to use an if statement to do this.

13. Create a file in order to complete this exercise. Last month Joe purchased some stock in Acme Software, Inc. Here are the details of the purchase:
   - The number of shares that Joe purchased was 2,000.
   - When Joe purchased the stock, he paid $40.00 per share.
   - Joe paid his stockbroker a commission that amounted to 3 percent of the amount he paid for the stock.

   Two weeks later Joe sold the stock. Here are the details of the sale:
   - The number of shares that Joe sold was 2,000.
   - He sold the stock for $42.75 per share.
   - He paid his stockbroker another commission that amounted to 3 percent of the amount he received for the stock.

   Write a program that displays the following information:
   - The amount of money Joe paid for the stock.
   - The amount of commission Joe paid his broker when he bought the stock.
   - The amount that Joe sold the stock for.
   - The amount of commission Joe paid his broker when he sold the stock.
   - Display the amount of money that Joe had left when he sold the stock and paid his broker (both times).

   You may hard code the values specified above instead of prompting for and reading them.
   (Modified: Gaddis, Tony. Programming Exercises, Chapter 2).

14. What output does the following code produce? Check your answer by entering the code in a file and running the program.

```
width = 5
height = 10
area = width * height
print(area)
width = 7
print(area)
area = width * height
print(area)
```

   If you would like to see a worked example of this problem, please refer to the PowerPoint slides on the course website titled prac02_q14_solution.pptx.

Checkpoint: Please make sure your supervisor sees both your program output and code.

Please make sure you save and keep all of your practical and assignment work. Please ask your supervisor if you are having difficulties doing so.

End of practical 2.