**Python Programming Practical 2**

**Due: 7 Feb 2013**

**Instructions**

Submit the following by adding to your git repository cpy5python.git. Your files should be organized as follows:

[cpy5python]

[practical02]

q01\_check\_even.py

q02\_triangle.py

q03\_determine\_grade.py

q04\_determine\_leap\_year.py

q05\_find\_month\_days.py

q06\_kilograms\_to\_pounds.py

q07\_miles\_to\_kilometres.py

q08\_top2\_scores.py

q09\_find\_smallest.py

q10\_find\_largest.py

q11\_find\_gcd.py

q12\_find\_factors.py

**1 (Checking whether a number is even)** q01\_check\_even.py

Write a program that reads an integer and checks whether it is even. 2 sample sessions are as follows:

Enter number: 25

25 is odd

Enter number: 8

8 is even

**2 (Validating triangles and computing perimeter)** q02\_triangle.py

Write a program that reads three edges for a triangle and determines whether the input is valid. The input is valid if the sum of any two edges is greater than the third edge. The program will compute the perimeter of the triangle if the input is valid. Otherwise, display that the input is invalid. 2 sample sessions are as follows:

Enter side 1: 2

Enter side 2: 2

Enter side 3: 1

Perimeter = 5

Enter side 1: 1

Enter side 2: 2

Enter side 3: 1

Invalid triangle!

**3 (Determining grade)** q03\_determine\_grade.py

Write a program that prompts the user to enter a score between 0 and 100 inclusive. The grading system is as follows:

A: 70 - 100

B: 60 - 69

C: 55 - 59

D: 50 - 54

E: 45 - 49

S: 35 - 44

U: 0 - 35

Sample sessions:

Enter score: 73

A

Enter Score: -1

Invalid! Score must be within 0 - 100.

**4 (Determining leap year)** q04\_determine\_leap\_year.py

Write a program that prompts the user to enter a year and determines whether it is a leap year. A year is a leap year if it is divisible by 4 but not 100, or is divisible by 400.

Sample sessions:

Enter year: 2012

Leap

Enter year: 2013

Non-Leap

**5 (Finding the number of days in a month)**q05\_find\_month\_days.py

Write a program that prompts the user to enter the month and year, and displays the number of days in the month. For example, if the user entered month 2 and year 2000, the program should display that February 2000 has 29 days. If the user entered month 3 and year 2005, the program should display that March 2005 has 31 days.

**6 (Conversion from kilograms to pounds)** q06\_kilograms\_to\_pounds.py

Write a program that displays the following table (1 kilogram = 2.2 pounds):

Kilograms Pounds

1 2.2

2 4.4

3 6.6

...

9 19.8

10 22.0

**7 (Conversion from miles to kilometres)** q07\_miles\_to\_kilometres.py

Write a program that displays the following two tables side-by-side (note that 1 mile is 1.609 kilometres):

Miles Kilometers Kilometres Miles

1 1.609 20 12.430

2 3.218 25 15.538

...

9 14.481 60 37.290

10 16.090 65 40.398

**8 (Finding the two highest scores)** q08\_top2\_scores.py

Write a program that prompts the user to enter the number of students and each student's name and score, and finally displays the student with the highest score and the student with the second-highest score.

**9 (Finding the smallest n such that n2 > 12000)** q09\_find\_smallest.py

Use a while loop to find the smallest integer n such that n2 is greater than 12,000.

**10 (Finding the largest n such that n3 < 12000)** q10\_find\_largest.py

Use a while loop to find the largest integer n such that n3 is less than 12,000.

**11 (Computing the greatest common divisor)** q11\_find\_gcd.py

A solution to find the greatest common divisor of two integers n1 and n2 is as follows: First find d to be the minimum of n1 and n2, then check whether d, d-1, … d-2, 2, or 1 is a divisor for both n1 and n2 in this order. The first such common divisor is the greatest common divisor for n1 and n2. Write a program to implement this solution.

**12 (Finding the factors of an integer)** q12\_find\_factors.py

Write a program that reads an integer and displays all its smallest factors. For example, if the input integer is 120, the output should be as follows: 2, 2, 2, 3, 5.