

PRG1	Programming I Diploma in ISF / IT / FI Year 1 (2017/18) Semester 1	Week 4
		60 minutes
Programming Aptitude Test 1 (15 %)		

Instructions

Prior to test

- Create a folder on your desktop with your student id
- Create 3 python files in that folder with the following naming convention
 - a. Q1_S12345678.py
 - b. Q2_S12345678.py
 - c. Q3_S12345678.py
- In each file, enter your **name**, **id** and **group** in the first line as comment:
 e.g. # John Tan (S12345678) – IT01

Submission

- Zip the 3 python files

1. MeL

PRG1 > Assessment > Programming Aptitude Test 1 > Submission

- Upload .zip file and “Submit”

2. Coursemology

Missions > Test 1 > Attempt > Qn 1

- Upload .zip file and “Finalize Submission”

Note: It is your RESPONSIBILITY to ensure that the files are submitted correctly

1. The minimum runway length an aeroplane requires for take-off can be calculated from its take-off speed v and acceleration a using the following formula:

$$length = \frac{v^2}{2a}$$

Write a program that prompts the user to enter the necessary information. Then, calculate and display the minimum runway length.

(3 marks)

2. A litre of diesel produces 2.6391 kilograms of carbon dioxide. Petrol, which has a lower carbon content, produces 2.3035 kilograms per litre. Write a program that

- prompts the user to enter the volume of fuel in litres,
- calculates and displays the mass of carbon dioxide produced for both diesel and petrol in 2 decimal places.

(5 marks)

3. The last alphabet of a Singapore IC number serves as a means to check if an IC number provided is valid.

To validate a given IC starting with 'T', the first, second, third, fourth, fifth, sixth and seventh digit needs to be multiplied by 2, 7, 6, 5, 4, 3, and 2 respectively. The result of the multiplications will then be added together. 4 will then needed to be added to the total. This is followed by obtaining the remainder after division by 11.

An example is given below:

Given an IC 'T1234567B', the total is computed as

$$1 \times 2 + 2 \times 7 + 3 \times 6 + 4 \times 5 + 5 \times 4 + 6 \times 3 + 7 \times 2 + 4 = 110$$

$$110 \div 11 = 10 \text{ with } 0 \text{ remainder}$$

Following which, the last alphabet in the IC can be checked by matching the remainder with the code:

0	1	2	3	4	5	6	7	8	9	10
J	Z	I	H	G	F	E	D	C	B	A

So for this case, since the check alphabet 'B' does not match the code 'J' for remainder 0, the IC is validated to be False.

Write a program that prompts user to enter a Singapore IC number starting with 'T', and displays the validity of the given IC number.

The following shows a sample run of the program. The input value is underlined.

```

Enter the IC to be validated: T1234567B
Validity of the IC: False

Enter the IC to be validated: T1234567J
Validity of the IC: True
  
```

(7 marks)

PLAGIARISM WARNING:

If a student is found to have submitted work not done by him/her, he/she will not be awarded any marks for this practical test. Disciplinary action may also be taken.

Similar action will be taken for student who allows other student(s) to copy his/her work, or posting any solutions or code related to the practical test before the end of the hour for the test.

*** END OF PAPER ***