



**Temasek Junior College**  
**2022 JC1 H2 Computing**  
**Practical 17 – Practice Questions**

**Question 1 (from YJC JC1 MYE P1 Q1)**

The Fibonacci sequence is a series of whole numbers where a number is calculated by adding

the previous two numbers.

The first twelve terms of the Fibonacci sequence are as follows:

0, 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, ...

**Task 1.1:** Write a program code `fibonacci(n)` to generate the  $n$ th term of the Fibonacci sequence.

For example:

`fibonacci(4)` = 2

`fibonacci(5)` = 3

A program, `fibonacci_odd(n)` has the following specifications:

- Takes in as input an integer  $n$
- Counts the number of odd-valued numbers in the first  $n$  terms of the Fibonacci sequence.
- Returns the number.

For example:

Input: 1      Output: 0

Input: 4      Output: 2

Input: 12      Output: 8

**Task 1.2:** Write a program code for this task.

## Question 2 (from YJC JC1 MYE P1 Q3)

The Rank Point for University Admission is calculated from the grades of three H2 content-based subjects, one H1 content-based subject, H1 General Paper (GP), and H1 Project Work (PW). The grades and their corresponding numerical Rank Point values are shown in the table below:

Grade	H2	H1
A	20	10
B	17.5	8.75
C	15	7.5
D	12.5	6.25
E	10	5
S	5	2.5
U	0	0

Table 1

The maximum Rank Point a student can obtain is 90.

For this question, we assume that the grades for H1 GP and H1 PW are both 'C'.

The Rank Point for a student who obtained a result of 'ABC/D', with grade 'ABC' for three H2 content-based subjects and 'D' for H1 content-based subject, is computed as follows:

$$(20 + 17.5 + 15) + 6.25 + (7.5 \times 2) = 73.75$$

A program, `rank_point`, is to calculate the Rank Point with the following specifications:

- Includes a helper function `grade_to_point` that converts the grade for a H2 content-based subject and returns the corresponding Rank Point value.
- Takes an input string ' $X_1X_2X_3/Y$ ' where ' $X_n$ ' represents the grade of the  $n^{\text{th}}$  H2 content-based subject while ' $Y$ ' represents the grade of H1 content-based subject.
- Computes the Rank Point using `grade_to_point`.
- Returns the Rank Point.

For example:

Input: ('AAA/A')                      Output: 85

Input: ('BBC/C')                      Output: 72.5

**Task 2:** Write a program code for this task.

### Question 3 (adapted from YJC JC1 MYE P1 Q5)

The Body Mass Index (BMI) is a measure of body fat of a person and is calculated based on the height and weight as follows:

$$\text{BMI} = \frac{\text{Weight (in kg)}}{(\text{Height (in m)})^2}$$

BMI Range	Classification
18.4 and below	Underweight
18.5 to 24.9	Healthy
25 to 29.9	Overweight
30 and above	Obese

Table 2

The data provided in data.csv file contains the students' name, height (in inch) and weight (in pound). The task is to find the number of students with a healthy BMI in this particular school.

**Task 3.1:** Write the codes for the following helper functions:

- `convert_ht(height)` : convert the height to metre (m) given that 1 inch = 0.0254 m
- `convert_wt(weight)` : convert the weight to kilogram (kg) given that 1 pound = 0.453592 kg.
- `bmi(height, weight)` : computes the BMI using the height (m) and weight (kg).

**Task 3.2:** Write a program code to go through all the students' data from the data.csv and count the number of students with healthy bmi.

#### Question 4 (YJC JC1 MYE P1 Q7)

Every Singaporean and permanent resident is uniquely identified with an NRIC number which contains 2 letters and 7 digits in the format as shown:

**S1234567D**

The first letter 'S' identifies those who were born before the year 2000 while the first letter 'T' identifies those born in or after the year 2000.

The last letter is known as the checksum to verify the validity of the NRIC number.

The checksum is obtained with the following scheme:

1. Each individual digit in the NRIC is multiplied by 7 fixed numbers: **2, 7, 6, 5, 4, 3, 2** respectively. For S1234567, we would have

$$1 \times 2, 2 \times 7, 3 \times 6, 4 \times 5, 5 \times 4, 6 \times 3, 7 \times 2$$

2. These products are added up as the total.
3. If the first letter of the NRIC starts with a 'T', then 4 is added to the total.
4. The total is then divided by 11 to obtain the remainder which corresponds to one of the 11 letters as shown in the Table 3 below:

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

Table 3

For example:

Input: 'S1234567'                      Output: 'D'

Input: 'T1234567'                      Output: 'J'

**Task 4:** Write a program code to find the last letter of the NRIC number.