C2

Problem Solving with Python

CHAPTER ASSIGNMENT

Name _____ Class _____ No. _____ Date _____

Answer every question in the space given. Show your working. You may use the chapter page to help you.

Questions from *Basic Science and Technology Textbook: Technology (Computing Science), Mathayom 2* (หนังสือเรียนรายวิชาพื้นฐาน วิทยาศาสตร์และเทคโนโลยี เทคโนโลยี (วิทยาการคำนวณ) ชั้นมัธยมศึกษาปีที่ ๒), 4th printing 2023, Institute for the Promotion of Teaching Science and Technology (IPST, สสวท.), Ministry of Education, translated into English, for classroom use.

Review before the lesson (ทบทวนความรู้ก่อนเรียน)

R1 Put a tick ✓ in front of each correct statement.

(a) ☐ An algorithm is one of the components of computational thinking (**แนวคิดเชิงคำนวณ**).

(b) ☐ Breaking a problem into smaller parts reduces the complexity of a big problem, so it is easier to design a way to solve it.

(c) ☐ A way of solving one problem can sometimes be used to solve a sub-problem of another problem.

(d) ☐ When cleaning the room, you can divide the work into smaller jobs so that each friend helps with one.

Try it (ลองทำดู)

(1) Think about the steps of cleaning clothes you have worn, all the way to putting the cleaned clothes away in the wardrobe. What jobs are there?

(2) Use Python's `turtle` module to draw a ring made of two overlapping circles.

Think about it (ชวนคิด)

T1 In everyday life, what situations repeat in a way that is like using the `while` statement?

T2 In the program of Example 2.5, which lines could you delete, with the program still working and giving the same results?

```
fare=6.50                                          #บรรทัดที่ 1
age=int(input("อายุของท่าน คือ "))                  #บรรทัดที่ 2
if age>=60:                                        #บรรทัดที่ 3
    fare=fare/2                                    #บรรทัดที่ 4
elif age<=3:                                       #บรรทัดที่ 5
    fare=0                                         #บรรทัดที่ 6
else:                                              #บรรทัดที่ 7
    fare=6.50                                      #บรรทัดที่ 8
print ("ค่าโดยสารของท่าน คือ", fare)                #บรรทัดที่ 9
```

Example 2.5 (#บรรทัดที่ n = line n)

T3 From the program in Example 2.5 (above), state which lines are the blocks (บล็อก) of statements under `if`, `elif` and `else`.

Activities from the chapter

2.1 Activity 2.1 (กิจกรรมที่ 2.1)

```
from math import pi                                                    #บรรทัดที่ 1
                                                                       #บรรทัดที่ 2
shape=input ('ต้องการหาพื้นที่ของ วงกลม(c) สามเหลี่ยม(t) หรือ          #บรรทัดที่ 3
สี่เหลี่ยม(r): ')
if shape=='c':                                                         #บรรทัดที่ 4
    r=float(input ('ป้อนรัศมีของวงกลม: '))                             #บรรทัดที่ 5
    area=pi*r*r                                                        #บรรทัดที่ 6
elif shape=='t':                                                       #บรรทัดที่ 7
    b=float(input ('ป้อนความยาวฐาน: '))                                #บรรทัดที่ 8
    h=float(input ('ป้อนความสูง:'))                                    #บรรทัดที่ 9
    area=(1/2)*b*h                                                     #บรรทัดที่ 10
else:                                                                  #บรรทัดที่ 11
    w=float(input ('ป้อนความกว้าง: '))                                 #บรรทัดที่ 12
    l=float(input ('ป้อนความยาว: '))                                   #บรรทัดที่ 13
    area=w*l                                                           #บรรทัดที่ 14
print('รูปดังกล่าวมีพื้นที่', area, 'ตารางหน่วย')                      #บรรทัดที่ 15
```

Example 2.6 (#บรรทัดที่ n = line n)

(1) Improve Example 2.6 as follows: check whether the user typed a letter other than 'c', 't' or 'r'; if so, the program should show an error message. Change the output in line 15 from "The shape has area" (รูปดังกล่าวมีพื้นที่) to "The circle has area", "The triangle has area" or "The rectangle has area", to match the letter typed in line 3.

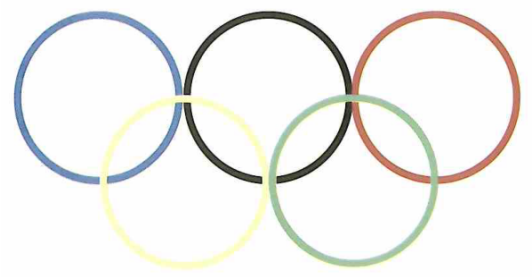
(2) Write a Python program that: reads a choice of whether to draw a circle or a square; reads the radius of the circle or the side length of the square; uses the Python turtle to draw the shape at the size that was read in.

(3) Write a Python program to analyse the score of a subject test, with scores from 0 to 100, and show the result of the analysis according to the score range as in the table below. But if there is work outstanding (งานค้างส่ง), the result is "ร", whatever the score.

Score	Result
From 0 up to (not including) 50, and no work outstanding	Fail (ไม่ผ่าน)
From 50 up to (not including) 70, and no work outstanding	Pass (ผ่าน)
From 70 up to (not including) 90, and no work outstanding	Good (ดี)
From 90 to 100, and no work outstanding	Excellent (เยี่ยม)
Work outstanding	ร

2.2 Activity 2.2 (กิจกรรมที่ 2.2)

(1) Use the Python turtle to draw the Olympic symbol, which is five overlapping coloured circles as in the picture. Create a function `myCircle()` to draw a circle.



(2) Write a program that draws stars with the Python turtle, by creating a function `star(x)` that takes one parameter, `x`, the size of the star. Then write a program that calls this function to draw a group of big and small stars.

End-of-chapter activity (กิจกรรมท้ายบท)

Activity The village where you live is holding a New Year party. You have been given the job of counting the boxes for storing washed plates. Each box holds 3 stacks of 10 plates. Solve the problem by following the problem-solving steps, to work out the smallest number of boxes that must be prepared so that they hold the plates exactly, with no boxes left over.

End-of-chapter exercises (แบบฝึกหัดท้ายบท)

1 *Solve each problem by following the problem-solving steps, to get a Python program for each of the following situations.*

You earn extra income by taking food to sell, and receive a share of the sales from the shop owner as follows:

Food item	Price per unit (baht)	Share per unit (baht)	Extra share
Cake (ขนมเค้ก)	10	2	More than 20 pieces: goes up to 3 baht a piece
Chicken sticky rice (ข้าวเหนียวไก่)	20	5	More than 30 packs: goes up to 7 baht a pack
Orange juice (น้ำส้ม)	15	3	More than 30 bottles: goes up to 5 baht a bottle

If you make sales of more than 500 baht, you receive a further share of 10 percent of the sales. From these conditions, write a program to summarise the total sales and the share received.

2 Which ride? (ขึ้นรถอะไรดี)

• An air-conditioned bus charges 5 baht per kilometre per person; for less than 1 kilometre the charge is 5 baht.

• A public taxi (รถรับจ้างสาธารณะ): the fare starts at 35 baht for the first 3 kilometres; distance beyond that is charged at an extra 2 baht per kilometre. One taxi takes at most 4 passengers.

You and a group of friends want to travel to a place. Which ride should you choose to save the most on fares?

3 Your form teacher gives you the job of recording your friends' height, weight and sex, and making a summary report made up of the following:

• name, surname, sex, height, weight

• the average height and weight of the whole class, and separated by sex

4 The teacher hires Auntie Cherry (ป้าเชอรี่) to make basil-chicken rice with fried egg (ข้าวกะเพราไก่ไข่ดาว) at school, x boxes, and Auntie Cherry must prepare the ingredients herself. How much do you think it costs Auntie Cherry altogether to make the basil-chicken rice with fried egg, and how much should she charge per box to make a profit of 30 percent?

15 boxes of basil-chicken rice use these ingredients:

Ingredient	Price of ingredient
Jasmine rice 2 kilograms	38 baht/kilogram
Chicken 1 kilogram	70 baht/kilogram
Holy basil leaves 200 grams	20 baht/kilogram
Chillies 200 grams	45 baht/kilogram
Garlic 20 grams	80 baht/kilogram
Eggs 15	3.50 baht/egg

Note: seasonings (sauce, soy sauce, sugar), the stove, water, electricity and containers for cooking are provided by the school, and are not counted as costs.

End of assignment · Check your answers against the chapter at gurujazzy.com/subjects/it/sem-2/chapter-2-problem-solving-with-python/