SCPY204: Computational Programming for Physicists

[2018-2019/II]

Exercise Set I: Program control (expression, condition and loop)

Instruction: You do not need to send the solutions of this exercise set back to me. But, if there is any question, you can ask by emailing me. This is the self-practice test. Make sure that you can do this exercise set yourself. So, you will be fine for the upcoming mid-term examination. In the exam, you are free to use whatever language you are familiar with (but C or Python is recommended).

1. Sum the odd integers between 1 and 99 using
   a) **for** loop
   b) **while** loop

2. Write statements in a loop (can use **for** or **while**) that print the following sequences of values:
   a) 1, 2, 3, 4, 5, 6, 7
   b) 3, 8, 13, 18, 23
   c) 20, 14, 8, 2, –4, –10
   d) 19, 27, 35, 43, 51

3. Calculate the value of π from this infinite series:

$$\pi = 4 - \frac{4}{3} + \frac{4}{5} - \frac{4}{7} + \frac{4}{9} - \frac{4}{11} + \cdots$$

   a) Write statements to print a table (line-by-line) showing the value of π approximated by one to twentieth terms of this series.
   b) If you want to get the value of $\pi = 3.14159$, how many terms of this series you need to use in the approximation?

4. Evaluate the logical result of these C expression:

```
a)  !( x < 5 ) && !( y >= 7 )
b)  !( a == b ) || !( g != 5 )
c)  !( ( x <= 8 ) && ( y > 4 ) )
d)  !( ( i > 4 ) || ( j <= 6 ) )
```

5. Write a program to print this diamond shape.

```
    *
   ***
  *****
 *******
  *****
   ***
    *
```

Use print statement and loop to print a single ‘=’ or a single blank ‘ ’ character.

6. An average yearly inflation (เงินเฟ้อ) is said to be 3% (for Thai economic history).
   a) Write a program to print the price of the noodle from 1980 to 2017. Assume that the price of a bowl of noodle in 1980 is 3 Baht.
   b) From you program, is it reasonable compare to the current price of a bowl of noodle. If not, you may discuss why?

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