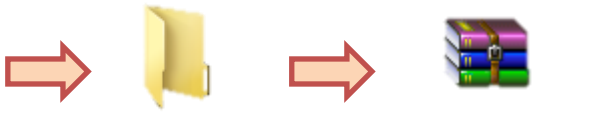
Programming Session Assignment 04

2017/10/24 by TA 陳泓弦

REQUIRED FILES

Please **compress a folder** named **PSA04_b06901XXX**(student ID) that contains the following files:

- ✓ b06901XXX _p1.cpp
- ✓ b06901XXX _p2.cpp
- ✓ b06901XXX _p3.cpp
- ✓ b06901XXX _p4.cpp



Do not submit executable files (.exe). Files with names in wrong format will not be graded. In your .cpp files, we suggest you write comments in detail as much as you can. It will be good for the TAs to read your code and your future reference and maintenance. (Due date: 10/25 06:00)

PROBLEM DESCRIPTION

Note: If your format does not match our prescribed format, you will get 1 point deducted.

1.

(a) Please calculate the sum of integer from 1 to N and output the sum. That is, sum is the value of 1+2+3+…+N. N is an input integer and TA will not make the value of sum out of range of "int".
(Note: In this problem, error testing as in (b) is no need.)

Format (3 lines):

```
Please input the integer N:
100
The sum is 5050.
```

Hint: Use for loop.

(b) Followed by (a), we need to add constraint for N and implement error testing. N is an input integer as in problem(a), but it should be larger than 100 and less than 1500 (100≤N≤1500) in this problem. If the input N is not in this range, it should warn the user and re-input another integer. Note that TA will test both cases of wrong input and correct input.

Format

correct input format **(3 lines)**:

```
Please input the integer N:
200
The sum is 20100.
```

wrong input format **(4 lines)**:

```
Please input the integer N:
66
[WARNING]
The input integer N should be larger than 100 and less than 1500.
```

Example:

```
Please input the integer N:
66
[WARNING]
The input integer N should be larger than 100 and less than 1500.
Please input the integer N:
2000
[WARNING]
The input integer N should be larger than 100 and less than 1500.
Please input the integer N:
150
The sum is 11325.
```

Hint: Use "while" to handle the wrong input.

2. Please write a program using "for/while" loop to print out the multiplication table from 1 to 5. Note that you need to take care of the number alignment. Any method not using the for/while loop will get 0 point.

Format (9 lines):

```
1*1= 1  2*1= 2  3*1= 3  4*1= 4  5*1= 5
1*2= 2  2*2= 4  3*2= 6  4*2= 8  5*2=10
1*3= 3  2*3= 6  3*3= 9  4*3=12  5*3=15
1*4= 4  2*4= 8  3*4=12  4*4=16  5*4=20
1*5= 5  2*5=10  3*5=15  4*5=20  5*5=25
1*6= 6  2*6=12  3*6=18  4*6=24  5*6=30
1*7= 7  2*7=14  3*7=21  4*7=28  5*7=35
1*8= 8  2*8=16  3*8=24  4*8=32  5*8=40
1*9= 9  2*9=18  3*9=27  4*9=36  5*9=45
```

3. When TA corrects midterm, TA accidentally records the grades upside down. So the grade of first student is actually the grade of the last student. The grade is in the range between 0 and 100 (0≤grade≤100). There are 10 students in the class and they all attend the midterm test.
   We will input 10 integers as the grades of the students but they are in the reverse order. Please output the correct order to help TA! When TA tests your program, we will use testing data in correct range of grade.
   (Note: Please use "int array" to store inputs and use "for/while" to print out your answer)

   Format (14 lines):

```
The grades of 10 students TA typed (in reverse order):
100 96 78 66 58 96 20 6 99 90
Correct order
Number  Grades
 1       90
 2       99
 3        6
 4       20
 5       96
 6       58
 7       66
 8       78
 9       96
10      100
```

4. Please declare two 3x3 dimension matrix A and B. The elements of A and B are shown below. Please do the matrix addition $C = A + B$. Please write a program so we can input two integers x, y as the index of C, and then print the value of C_{xy} (C_{ij} is the element of i th row and j th column. For example, A_{12}=2 and B_{33}=7). Please use "2-dimension array" to represent matrix and use "for/while" to do the matrix addition. Note no matrix addition calculation in your code will get 0 point.

$$A = \begin{bmatrix} 11 & 22 & 33 \\ 22 & 33 & 44 \\ 33 & 44 & 55 \end{bmatrix}, \quad B = \begin{bmatrix} 3 & 2 & 1 \\ 6 & 5 & 4 \\ 9 & 8 & 7 \end{bmatrix}$$

Formula of matrix addition:

$$A = \begin{bmatrix} A_{11} & A_{12} & A_{13} \\ A_{21} & A_{22} & A_{23} \\ A_{31} & A_{32} & A_{33} \end{bmatrix},\ B = \begin{bmatrix} B_{11} & B_{12} & B_{13} \\ B_{21} & B_{22} & B_{23} \\ B_{31} & B_{32} & B_{33} \end{bmatrix}$$

$$C = A + B = \begin{bmatrix} C_{11} & C_{12} & C_{13} \\ C_{21} & C_{22} & C_{23} \\ C_{31} & C_{32} & C_{33} \end{bmatrix},\ C_{ij} = A_{ij} + B_{ij}$$

Format (3 lines):

```
Please input the index of matrix:
3 3
The value of C33 is 62.
```