Report for Assignment 1

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Collaboration:

Gong Zelin explained to me what is asked in problem 5

Question1

Take Print_values(a=7, b=3, c=4) as example

```
In [25]: runfile('/Users/violetxu/Documents/Spyder/ESE5023/PS1/PS1_1.py', wdir='/
Users/violetxu/Documents/Spyder/ESE5023/PS1')

输入数字a7

输入数字b3

输入数字c4
7.0 4.0 3.0
```

Question2

M1 and M2 are random matrices.

```
In [30]: runfile('/Users/violetxu/Documents/Spyder/ESE5023/PS1/PS1_2.py', wdir='/
Users/violetxu/Documents/Spyder/ESE5023/PS1')
[7, 45, 4, 45, 11, 23, 42, 21, 4, 13]
[5, 19, 7, 43, 25, 13, 18, 21, 13, 42]
[3, 36, 13, 20, 12, 42, 43, 8, 28, 36]
[20, 43, 47, 16, 15, 8, 41, 35, 33, 20]
[27, 40, 3, 46, 29, 13, 36, 20, 1, 31]

[46, 7, 29, 22, 28]
[26, 44, 6, 16, 31]
[32, 4, 16, 10, 47]
[31, 15, 15, 11, 0]
[22, 20, 14, 49, 34]
[49, 23, 29, 4, 33]
[41, 41, 3, 7, 28]
[15, 48, 30, 0, 42]
[28, 40, 0, 27, 48]
[35, 39, 22, 1, 30]

[6988, 6866, 3075, 2455, 5552]
[6355, 6247, 3351, 2753, 5607]
[8359, 7834, 3358, 2841, 7569]
[8590, 8405, 3885, 3739, 9678]
[7968, 7215, 3934, 3553, 6378]
```

Question3

Result of Pascal_triangle(100):

```
In [32]: runfile('/Users/violetxu/Documents/Spyder/ESE5023/PS1/PS1_3.py', wdir='/Users/violetxu/Documents/Spyder/ESE502
PS1')
[1, 100, 4950, 161700, 3921225, 75287520, 1192052400, 16007560800, 186087894300, 1902231808400, 17310309456440,
141629804643600, 1050421051106700, 7110542499799200, 44186942677323600, 253338471349988640, 1345860629046814650,
6650134872937201800, 30664510802988208300, 132341572939212267400, 535983370403809682970, 2041841411062132125600,
7332066885177656269200, 24865270306254660391200, 797760755659003687555100, 24251926972033721015504,
699574816500972464467800, 19173532007804430507636600, 499881370203472652520100, 12410847811948286545336800,
293723398216109448239637600, 6632463830686342379604720, 143012501349174257560226775, 2946924270225408943666527900,
58071742972088940948698145 0, 1095067153187962886461165020, 19772045821449329894437701 75, 342002954749393814390273760 0,
567004898663468692278611700, 9013924030034630492634340800, 137462341458028115012673697 20, 201164402133699680506351752 00,
282588088711625741663684604 00, 381165328959867279453342042 00, 493782357907371571747364762200,
614484712141361795967205929 60, 734709981908149973439050568 00, 844134872830640395015079376 00,
932065588750498769495861681 100, 989130828878080326811887228 00, 100891344545564193334812497256,
989130828878080326811887222800, 932065588750498769495861681100, 844134872830640395015079376 00,
734709981908149973439050568 00, 614484712141361795967205929 60, 493782357907371571747364762200,
381165328959867279453342042 000, 282588088711625741663684604 00, 201164402133699680506351752 00,
137462341458028115012673697 20, 901392403003463049263434080 0, 567004898663468692278611700 0, 342002954749393814390273760 0,
197720458214493298944377017 5, 109506715318796288646116502 0, 580717429720889409486981450, 294692427022540894366527900,
143012501349174257560226775, 663246383068634237960472 00, 293723398216109448239637600, 124108478119482865453368 00,
499881370203472652520510 0, 191735320078044305076360 0, 699574816500972464467800, 242519269720337121015504,
797760755659003687555100, 248652703062546603912 00, 733206688517765626920 0, 204184141106213212560 0, 535983370403809682970,
132341572939212267400, 306645108029882083 00, 665013487293720188 0, 134586062904681456 0, 253338471349988640,
44186942677323600, 7110542499799200, 1050421051106700, 141629804643600, 17310309456440, 1902231808400, 186087894300,
16007560800, 1192052400, 75287520, 3921225, 161700, 4950, 100, 1]
```

Result of Pascal_triangle(200):

Question4

Result of Least_moves(2) and Least_moves(5):

```
In [36]: runfile('/Users/violetxu/Documents/Spyder/ESE5023/PS1/PS1_4.py', wdir='/Users/violetxu/
Documents/Spyder/ESE5023/PS1')
1

3
```

Take Least_moves(63) as example:

```
In [37]: runfile('/Users/violetxu/Documents/Spyder/ESE5023/PS1/PS1_4.py', wdir='/Users/violetxu/
Documents/Spyder/ESE5023/PS1')
10
```

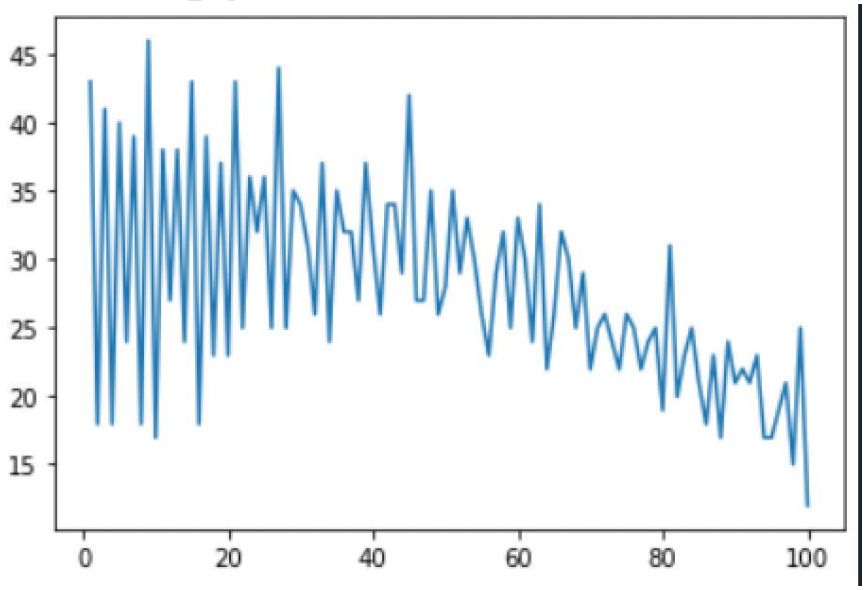
Question5

(1) . Result of Find_expression():

Take Find_expression(50) as example

```
In [20]: runfile('/Users/violetxu/Documents/Spyder/ESE5023/PS1/PS1_5.py', wdir='/
Users/violetxu/Documents/Spyder/ESE5023/PS1')
12-3-4-5+67-8-9=50
1+2-3+4+56+7-8-9=50
12-3+45+6+7-8-9=50
1-2-3-4-5-6+78-9=50
1-23+4+5-6+78-9=50
1+2+34-56+78-9=50
1+2+3-4+56-7+8-9=50
1-2+34+5+6+7+8-9=50
1+2-34+5-6-7+89=50
1-2+34-5-67+89=50
1-2-34-5-6+7+89=50
1+2+3+4-56+7+89=50
1-2-3+4+56-7-8+9=50
1-23-4-5-6+78+9=50
12+3+4-56+78+9=50
1-2+3-45+6+78+9=50
1+2+34-5-6+7+8+9=50
-1+23-4+56-7-8-9=50
-12+3+4+5+67-8-9=50
-1-2+3+4+56+7-8-9=50
-1-23+4-5+6+78-9=50
-1+2-3+4+56-7+8-9=50
-12-3+4-5+67+8-9=50
-1+2-34-5+6-7+89=50
-1+2+3-4+56-7-8+9=50
-12+3-4-5+67-8+9=50
-12+3+45+6+7-8+9=50
-1-2+34+5+6+7-8+9=50
28
```

(2) . Plot of Total_expression:



Maximum and Minimum of Total_solutions:

```
In [22]: runfile('/Users/violetxu/Documents/Spyder/ESE5023/PS1/PS1_5.py', wdir='/
Users/violetxu/Documents/Spyder/ESE5023/PS1')
[43, 18, 41, 18, 40, 24, 39, 18, 46, 17, 38, 27, 38, 24, 43, 18, 39, 23, 37, 23, 43,
25, 36, 32, 36, 25, 44, 25, 35, 34, 31, 26, 37, 24, 35, 32, 32, 27, 37, 31, 26, 34,
34, 29, 42, 27, 27, 35, 26, 28, 35, 29, 33, 30, 26, 23, 29, 32, 25, 33, 30, 24, 34,
22, 26, 32, 30, 25, 29, 22, 25, 26, 24, 22, 26, 25, 22, 24, 25, 19, 31, 20, 23, 25,
21, 18, 23, 17, 24, 21, 22, 21, 23, 17, 17, 19, 21, 15, 25, 12]
Number 9 have the max expression
Number 100 have the max expression

In [23]:
```