Basecamp Challenge Treasure Hunt

Part III

1. Try to find the ‘system’ in this number series and calculate the 1000th number:

0, 1, 3, 6, 2, 7, 13, 20, 12, 21, 11, 22, 10,…..

1. Look at this number grid:

23 92 86 40 43 88 76 86 76 20 53 26 30 55 14

74 16 58 39 72 80 16 69 39 81 27 43 19 58 15

65 46 82 92 50 59 34 18 27 42 38 80 62 73 33

77 85 69 18 58 88 39 29 24 67 29 62 41 37 77

46 95 38 19 61 40 90 70 99 16 94 51 92 62 63

43 58 90 44 49 36 51 65 25 80 52 24 94 35 93

72 24 56 42 47 77 90 61 18 36 46 39 98 11 90

73 53 61 53 31 73 23 70 41 29 36 30 24 27 30

68 47 94 31 96 42 33 62 68 63 41 72 72 68 65

48 68 92 48 94 39 84 60 35 41 87 45 89 77 67

15 87 47 68 50 37 28 51 43 98 95 91 39 29 96

60 19 37 61 36 36 81 42 56 83 29 14 27 66 15

88 78 36 50 26 70 55 38 65 94 39 92 71 73 82

96 37 87 54 22 30 49 82 15 37 55 24 14 26 72

38 85 55 44 21 71 50 83 84 84 54 99 16 92 24

17 82 51 16 70 66 69 98 40 39 49 93 24 73 77

The red numbers form a 3x3 square with total 542

Find the 3x3 square in this grid with the largest sum. What is this sum?

1. Alice, Bob, Chris, …, Zoe (let’s call them A, B, C, ….., Z) are participating in.a Crossfit Event.   
   There are 10 challenges and they can score points for each challenge..  
   For each participant the worst and the best performance are removed from the scores and the remaining 8 are summed up. Who ended 1, 2 and 3? Enter your result like: BVF.

A [22, 85, 39, 42, 87, 75, 85, 75, 19, 52]

B [25, 29, 54, 13, 73, 15, 57, 38, 71, 79]

C [15, 68, 38, 80, 26, 42, 18, 57, 14, 64]

D [45, 81, 49, 58, 33, 17, 26, 41, 37, 79]

E [61, 72, 32, 76, 84, 68, 17, 57, 87, 38]

F [28, 23, 66, 28, 61, 40, 36, 76, 45, 37]

G [18, 60, 39, 89, 69, 15, 50, 61, 62, 42]

H [57, 89, 43, 48, 35, 50, 64, 24, 79, 51]

I [23, 34, 71, 23, 55, 41, 46, 76, 89, 60]

J [17, 35, 45, 38, 10, 89, 72, 52, 60, 52]

K [30, 72, 22, 69, 40, 28, 35, 29, 23, 26]

L [29, 67, 46, 30, 41, 32, 61, 67, 62, 40]

M [71, 71, 67, 64, 47, 67, 47, 38, 83, 59]

N [34, 40, 86, 44, 88, 76, 66, 14, 86, 46]

O [67, 49, 36, 27, 50, 42, 90, 38, 28, 59]

P [18, 36, 60, 35, 35, 80, 41, 55, 82, 28]

Q [13, 26, 65, 14, 87, 77, 35, 49, 25, 69]

R [54, 37, 64, 38, 70, 72, 81, 36, 86, 53]

S [21, 29, 48, 81, 14, 36, 54, 23, 13, 25]

T [71, 37, 84, 54, 43, 20, 70, 49, 82, 83]

U [83, 53, 15, 23, 16, 81, 50, 15, 69, 65]

V [68, 39, 38, 48, 23, 72, 76, 15, 30, 59]

W [11, 41, 10, 73, 48, 78, 83, 54, 81, 10]

X [16, 77, 87, 59, 86, 74, 60, 19, 44, 18]

Y [20, 36, 13, 47, 22, 58, 19, 90, 32, 67]

Z [39, 30, 30, 24, 16, 89, 30, 52, 88, 22]

1. Bob is in a very strange elevator: when you press UP, the elevator goes from x to 3x+1 and when you press DOWN and the number is even, it goes to x//2 otherwise the lift goes to x+1. So if you are at 13 and press UP, DOWN, DOWN you are at 10. After UP, DOWN you are at 32. Bob starts at the 10th floor and presses 10 times on one of the two buttons. Now he is on the 60th floor. Can you figure out which buttons he pressed?  
   Enter your answer like UUUDDDUUUD.
2. Alice and Bob are playing a guessing game. Bob has written a number on a piece of paper.

Each turn Alice tries with three numbers. Bob calculates the 3 differences and multiplies them.

Then it is Alice’s turn again. When she is sure about the number she calls it.

The game begins:

Alice: 35, 146, 1736

Bob: 606029204

Alice: I know the number!

Bob is flabbergasted, he thought it was a difficult game.

  What is the hidden number?

1. Run turtle4.py

How many points has this star?

1. A well known system in cryptography is the Caesar cipher.   
   We make a system that is slightly more complicated. For example the (7,2)-system:

Make a sequence 7, 9, 11, 13, 15, …. and code the first letter of your message with +7 (if you are at the end of the alphabet, you count further from the beginning, the second with +9, etc. With +7 we mean: shift 7 letters to the right. Spaces are removed.

With (7,2) the sentence MEETING AT FOUR OCLOCK IN THE SECRET ROOM becomes:

TNPGXEZVQEPXWVLWBRBBIQGFVJJAPGGFHH

Now try decode (it’s not the (7,2)-system of course):

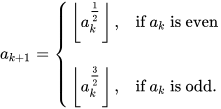
CIJLRMAQFUPVEKHSMUEZFULZGLYFWJOSVMJNFGAXWNARWQFOFGDXKFQ

1. Aka Seline ….. ???

1. Look at this formula to produce a sequence of numbers:



If you start with a0 = 13 you get: [13, 46, 6, 2, 1] with len=5 and max=46

If you start with a0 = 23 you get: [23, 110, 10, 3, 5, 11, 36, 6, 2, 1] with len=10 and max=110

All the sequences end with 1

Find the smallest a0 that produces 51 numbers.

1. Hints needed !!!! Unless you are a genius or an experience cryptographer.

FGDXFFFDGD