Looping Constructs

1.Candy Game

Mona set off with great zeal to the "Fun Fair 2017". There were numerous activities in the fair, though Mona liked the Candy game. Delicious candies were wrapped in colourful foiled sheets with some random numbers on each of the candies. The game coordinators then formed many groups of few candies together, such that each candy group makes an integer and hid them all around the room. The objective of the game is that the players should look for the occurrences of number four anywhere in the integers (candy groups) placed in the room.

Mona started off with the game where there are many such integers, for each of them she should calculate the number of occurrences of the digit **4** in the decimal representation. Can you please help her in succeeding the game?

Input Format:

The only line of input contains a single integer from the candy group.

Output Format:

Output should contain the number of occurrences of the digit **4** in the respective integer from the candy groups that Mona gets.
Refer sample input and output for formatting specifications.

Sample Input 1:

447474

Sample Output 1:

4

Sample Input 2:

12

Sample Output 2:

0

2.Team Event

Super Quiz Bee is a famous quiz Competition that tests students on a wide variety of academic subjects. This week's competition was a Team event and students who register for the event will be given a unique registration code **N**. The participants are teamed into 10 teams and the team to which a participant is assigned to depends on the absolute difference between the first and last digit in the registration code.

The event organizers wanted your help in writing an automated program that will ease their job of assigning teams to the participants. If the registration number given is less than 10, then the program should display "Invalid Input".

Input Format:

The only line of input contains an integer **N**.

Output Format:

Output the absolute difference between the first and last digit of **N**.
Refer sample input and output for formatting specifications.

Sample Input 1:

345

Sample Output 1:

2

Sample Input 2:

9

Sample Output 2:

Invalid Input

3.Lucky Pairs

Richie and Riya are participating in a game called "Lucky pairs" at the Annual Game Fair in their Company. As per the rules of the contest, two members form a team and Richie initially has the number **A** and Riya has the number **B**.
There are a total of **N** turns in the game, and Richie and Riya alternatively take turns. In each turn the player whose turn it is, multiplies his or her number by 2. Richie has the first turn. Suppose after the entire N turns, Richie's number has become C and Riya's number has become D. The final score of the team will be the sum of the scores (C+D) of both the players after N turns.

Write a program to facilitate the quiz organizers to find the final scores of the teams.

Input Format:
The only line of input contains 3 integers **A**, **B**, and **N**.

Output Format:
Output a single line which contains the integer that gives the final score of the team which will be the sum of the scores of both the players after N turns.
Refer sample input and output for formatting specifications.

Sample Input 1:
1 2 1

Sample Output 1:
4

Sample Input 2:
3 2 3

Sample Output 2:
16

4.Cookery Contest

Suzanne is participating in the Cookery Contest to be held at her Company. Suzanne is just a beginner in cooking but is more creative. She wanted to give a good show though she is going to cook for the first time. So she decided to cook only a small portion of her recipe, which has the same ratios of ingredients, but makes less food.

Suzanne however, does not like fractions. The original recipe contains only whole numbers of ingredients, and Suzanne wants the reduced recipe to only contain whole numbers of ingredients as well. Help her determine how much of each ingredient to use in order to make as little food as possible.

Input Format:

The first line of the input consists of a positive integer N, which corresponds to the number of ingredients.
Next line contains N space-separated integers, each indicating the quantity of a particular ingredient that is used.

Output Format:

Output exactly N space-separated integers on a line that gives the quantity of each ingredient that Suzanne should use in order to make as little food as possible.
Refer sample input and output for formatting specifications.

Sample Input 1:

2
4 4

Sample Output 1:

1 1

Sample Input 2:

3
2 3 4

Sample Output 2:

2 3 4

5.Count

Mars Spell Bee is the largest self-motivated spelling competition held for school children. The children from different schools who are participating in the competition will be given a registration code. The registration is on a first come first serve basis to a maximum of **N** entries.

The competition is conducted in two different galleries of the venue. Just for the ease of their management, the Event organizers have announced to divide the children into two groups, to attend the competition in the two chosen galleries. By that note, all those children who have their registration code as an even number will be put in one gallery and those with odd number will be in another gallery.
Help the organizers to find count of number of even registration codes and odd registration codes from the total **N**.

Note: The registration code need not be unique as each child will have a unique school code.

Input Format:

The first line of input consists of a single integer **N** denoting the number of registration codes issued for the competition.
The second line of input consists of **N** space separated integers, denoting the registration codes of each child.

Output Format:

Output a single with the count of even numbers and odd numbers from N, separated by a single space.
Refer sample input and output for formatting specifications.

Sample Input 1:

3
1 4 10

Sample Output 1:

2 1

Sample Input 2:

5
2 6 23 12 11

Sample Output 2:

3 2

6.New Administrative Policy

"Pine Tree" is a recently launched startup Event Management company. The company gained a good reputation within a short span because of its highly reliable service delivery. As per the new administrative policies of the company, the Chairman of the company is elected every 4 years, the Finance Director is appointed every 2 years, the Chief Technical Director is elected every 3 years and the Security Chief is replaced every 5 years.

This year, Year X, the newly elected Chairman announced the appointment of the Finance Director, a new Chief Technical Director and congratulated the Security Chief for winning the recent election. That is, all positions were changed over. This is highly unusual. You will quantify how unusual this really is.

Write a program that inputs the year X and the future year Y and lists all years between X and Y inclusive when all positions change.

Input Format:
First line of the input is an integer that corresponds to the year X.
Second line of the input is an integer that corresponds to the future year Y.

Output Format:
Output in separate lines the list of years between X and Y inclusive when all positions change.
Refer sample input and output for formatting specifications.

Sample Input 1:
2004
2100

Sample Output 1:
All positions change in year 2004
All positions change in year 2064

Sample Input 2:
1900
2017

Sample Output 2:
All positions change in year 1900
All positions change in year 1960

7.AES Numbers

Varun is the founder of Event Management Company, "Sparsh Services". In the company all the financial transactions are carried out online and Varun has strictly insisted his staff to do any transactions on web browsers that supports AES encryption numbers.

A number is an AES number if it has exactly four divisors. In other words, there are exactly four numbers that divide into it evenly. For example, 10 is an AES number because it has exactly four divisors (1, 2, 5, 10). 12 is not an AES number because it has too many divisors (1, 2, 3, 4, 6, 12). 11 is not an AES number either. There is only one AES number in the range 10...12.
Given a range of numbers, write a program that counts how many numbers from that range are AES numbers.

Input Format:

The input consists of 2 space-separated integers, which corresponds to the lower limit and the upper limit of the number range.
You may assume that the numbers in the range are less than 1000.

Output Format:

Output a single line that gives the count of AES numbers from the given range.
Refer sample input and output for formatting specifications.

Sample Input 1:

1 20

Sample Output 1:

5

Sample Input 2:

50 100

Sample Output 2:

17

8.Charity Dinner

WeCanNGO Trust is organizing a charity dinner at St. John's College. Since older students are both wiser and richer, the members of the trust decide that the price of each ticket will be based on how many years the students have been in the school. A first year student will buy a PINK ticket, a second year student will buy a GREEN ticket, a third year student will buy a RED ticket, and a fourth year student will buy an ORANGE ticket.

Assume that all tickets are sold. Each colour of ticket is uniquely priced. Write a program to output all combinations of tickets that produce exactly the desired amount to be raised. The combinations may appear in any order. Also display the total number of combinations found and the smallest number of tickets to be printed to raise the desired amount so that printing cost is minimized.

Input Format:

First 4 lines of the input correspond to the cost of a PINK, GREEN, RED, ORANGE ticket (in the exact order).
Last line of the input corresponds to the exact amount of money to be raised by selling tickets.

Output Format:

Output all combinations of tickets that produce exactly the desired amount to be raised. The combinations may appear in any order. Output the total number of combinations found. Output the smallest number of tickets to print to raise the desired amount so that printing cost is minimized.
Refer sample input and output for formatting specifications.

Sample Input 1:

```
1
2
3
4
3
```

```
# of PINK is 0 # of GREEN is 0 # of RED is 1 # of ORANGE is 0
# of PINK is 1 # of GREEN is 1 # of RED is 0 # of ORANGE is 0
# of PINK is 3 # of GREEN is 0 # of RED is 0 # of ORANGE is 0
Total combinations is 3
Minimum number of tickets to print is 1
```

Sample Input 2:

```
1
2
4
3
4
```

Sample Output 2:
of PINK is 0 # of GREEN is 0 # of RED is 1 # of ORANGE is 0
# of PINK is 0 # of GREEN is 2 # of RED is 0 # of ORANGE is 0
# of PINK is 1 # of GREEN is 0 # of RED is 0 # of ORANGE is 1
# of PINK is 2 # of GREEN is 1 # of RED is 0 # of ORANGE is 0
# of PINK is 4 # of GREEN is 0 # of RED is 0 # of ORANGE is 0
Total combinations is 5
Minimum number of tickets to print is 1

9.Peter and Casino

Hotel Royal Gardenia has arranged for an elite business party for the lead industrialists and celebrities of the City. Followed by a dinner buffet, the Event coordinators planned for some casino game events for the high-toned crowd. Peter was a visitor at the party and he takes some number of rubles to the casino with the intention of becoming rich. He plays three machines in turn. Unknown to him, the machines are entirely predictable. Each play costs one ruble. The first machine pays 20 rubles every 25th time it is played; the second machine pays 80 rubles every 120th time it is played; the third pays 8 rubles every 12th time it is played.
Given the number of rubles with Peter initially (there will be at least one and fewer than 1000), and the number of times each machine has been played since it last paid, write a program that calculates the number of times Peter plays until he goes broke.

Input Format:
First line of the input is an integer that corresponds to the number of rubles with Peter initially.
Next 3 lines of the input is an integer that corresponds to the number of times each machine has been played since it last paid.

Output Format:
Output a single line that gives the number of times Peter plays until he goes broke.
Refer sample input and output for formatting specifications.

Sample Input 1:
48
3
12
4

Sample Output 1:
Peter plays 56 times before going broke

Sample Input 2:
35
10
30
9

Sample Output 2:
Peter plays 71 times before going broke

10.Kids Love Muffins

Louis was celebrating his 10th Birthday and his parents have promised to make the best party ever for him. He will be very happy if he can invite all his friends to this party (he has many friends), but unfortunately his parents can't invite everyone because they have a limited number of muffins, and they want everyone to be happy.

As we all know, kids love to eat a lot of muffins of the same type, let's say a kid will be happy only if he can eat at least K muffins of the same type.

Given K, and the number of available muffins of each type, calculate the maximum number of kids where Louis's parents can make all of them happy by giving each one at least K muffins of the same type.

Input Format:
The first line of the input contains two space-separated integers N, the number of different muffins ($1 \leq N \leq 100$), and K, the minimum number of muffins which will make a kid happy as described above ($1 \leq K \leq 100$).
The second line of input contains N integers, separated by a single space, which are the available number of muffins of each type. There will be at least 1 muffin and at most 100 muffins of each type.

Output Format:
Output on a single line one integer, the maximum number of kids Louis' parents can make happy by giving each one at least K muffins of the same type.
Refer sample input and output for formatting specifications.

Sample Input 1:
3 2
4 5 7

Sample Output 1:
7

Sample Input 2:
3 8
4 5 7

Sample Output 2:
0

11.Lucky Cards

The Hatfield Game Fair is the premier event of its kind for adults interested in some intellectual and cognitive brain games. Exciting games were organized for kids between age group of 8 and 10. One such game was the "Lucky Cards", a simple two-player game, played with a deck of cards. The cards in the deck have these possible names: *two, three, four, five, six, seven, eight, nine, ten, jack, queen, king, ace*. The cards labeled *jack, queen, king, ace* are collectively known as *high cards*. The numerical equivalent of the high cards is as given below:
Jack – 11
Queen – 12
King – 13
Ace - 1
Please note here, though Ace has a numerical equivalent value as 1, it is always considered as the top rated card. So it is also included in the list of high cards.

The game organizer selects N cards and places it in the deck faced-down on the table. Player A turns over the top card and places it on a pile; then player B turns over the top card and places it on the same pile. A and B alternate turns until the N cards are exhausted. The game is scored as follows:

- if a player turns over an ace that is 1, with at least 4 cards remain to be turned over, and none of the next 4 cards is a high card, that player scores 4 points
- if a player turns over a king that is 13, with at least 3 cards remain to be turned over, and none of the next 3 cards is a high card, that player scores 3 points
- if a player turns over a queen that is 12, with at least 2 cards remain to be turned over, and none of the next 2 cards is a high card, that player scores 2 points
- if a player turns over a jack that is 11, with at least 1 card remains to be turned over, and the next card is not a high card, that player scores 1 point

Write a program to calculate the scores of the two players.

Input Format:

The first line of the input contain an integer N, which corresponds to the number of cards in the deck.
Each of the following N lines will contain an integer that corresponds to the numerical value of the cards that the players turn over. The first line denotes the first card to be turned over; the next line the next card; and so on.

Output Format:

Print the individual scores of the players whenever a player scores in separate new lines.
Print the total score for each player in the last two lines of the output at the end of the game.
Refer sample input and output for formatting specifications.

Sample Input 1:

```
15
3
2
1
5
6
4
8
11
2
3
2
13
6
10
6
```

Sample Output 1:

```
Player A scores 4 point(s)
Player B scores 1 point(s)
Player B scores 3 point(s)
Player A: 4 point(s)
Player B: 4 point(s)
```

Sample Input 2:

```
15
3
2
1
5
6
12
8
11
12
3
1
13
6
11
6
```

Sample Output 2:

Player B scores 1 point(s)
Player A: 0 point(s)
Player B: 1 point(s)

12.Inverted Hollow Pyramid

The much awaited event at the entertainment industry every year is the "Screen Awards". This year the event is going to be organized on December 25 to honour the Artists for their professional excellence in Cinema. The Organizers of the event, J&R Events, decided to design some attractive and LED Matrix panel boards for the show promotions all across the venue.

The Event organizers wanted to program the display boards with some specific pattern using alphabets and special characters. Help them write a program to design the pattern of an inverted hollow pyramid in the matrix panel, given the number of lines of the pattern.

Input Format:

First line of the input is an integer that refers to the number of lines in the pattern.

Output Format:

Output the pattern as given in the output.
Refer sample input and output for formatting specifications.

Sample Input 1:

4

Sample Output 1:

```
*******
b*iii*b
bb*i*bb
bbb*bbb
```

Sample Input 2:

5

Sample Output 2:

```
*********
b*iiiii*b
bb*iii*bb
bbb*i*bbb
bbbb*bbbb
```

13.Math Challenge

In connection to the National Mathematics Day celebration, the Regional Mathematical Scholars Society had arranged for a Math Challenge Event where high school students participated in large number. First level of the challenge was oral quiz, followed by a written test in the second round.
In the second round, the problem that the students had to answer goes like this:
For every positive number ‘n’ we define a function streak(n)=k as the smallest positive integer k such that n+k is not divisible by k+1.

E.g:
13 is divisible by 1
14 is divisible by 2
15 is divisible by 3
16 is divisible by 4
17 is NOT divisible by 5
So streak(13)=4.
Similarly:
120 is divisible by 1
121 is NOT divisible by 2
So streak(120)=1.
Now, define P(s,N) to be the number of integers n, 1<n<N, for which streak(n)=s.
Write a program to get the input as 's' and 'N' and find the count of integers until N which has the streak value as 's'.

For example,
If s=3 and N=14.
If we compute streak value for the integers from 1 to N, we can see only the integer 7 have the streak value as 3, because
7 is divisible by 1
8 is divisible by 2
9 is divisible by 3
10 is NOT divisible by 4
Hence streak(7)=3.
So P(3, 14) = 1 and so the output is 1.

Input Format:

First line of the input is an integer ‘s’ which is the streak value of an integer n.
Second line of the input is an integer ‘N’ which is the upper limit of numbers until which P(s,N) is calculated.

Output Format:

Output is an integer that gives the count of integers until ‘N’ which has the streak value as ‘s’.
Refer sample input and output for formatting specifications.

Sample Input 1:

3

14

Sample Output 1:

1

Sample Input 2:

1
10

Sample Output 2:

5

14.Connect the Ropes

It was Christmas Eve and the celebrations remembering the birth of Jesus were going on in full swing at the Catheral Chapel. The Event Management Team had arranged for some exciting games after the mass worship and feast, where adults and kids of all ages participated very actively. "**Connect the Ropes**" was organized for the kids where each kid will be given **N** ropes and the goal of the game is that the kids has to connect all of the ropes with each other to get one rope. When kids connect 2 ropes with each other they lose **'k'** units from each rope.

You have to find what the length of the resulting final rope is. For example if a kid gets 3 ropes of lengths 3, 4 and 6 and k=1. He can connect 3 and 4 to get a rope of length 5, he then can connect the ropes of length 5 and 6 to get the final rope of length 9.

The kids will keep selecting any pair of ropes and will connect them together until there is only 1 rope left. Which ropes to connect first and which order doesn't really matter, at the end the resulting rope will be the same length regardless his decisions. Write a program to find the length of the resulting final rope.

Input Format:

First line of the input is an integer contains two space-separated integers N (1 <= N <= 100) representing the number of ropes and an integer 'k'.
Second line of the input contains N integers separated by a single space, representing the ropes' lengths. Each rope length will not be less than 2 and will not be greater than 100.

Output Format:

Output a single line which contains a single integer representing the length of the final resulting rope.
Refer sample input and output for formatting specifications.

Sample Input 1:

3 1
3 4 6

Sample Output 1:

9

Sample Input 2:
3 2
3 4 6

Sample Output 2:
5

15.Fair Francis

"Think Academy" has arranged for a competitive test for engineering students from rural villages. Those successful students of the test will be awarded the scholarship for their GRE/TOEFL preparations at Think Academy. Francis, the co-coordinator and founder of the academy has **N** different problemsets and there are N students who are appearing for the test. Each problemset contains zero or more problems. He will give each student exactly one problemset. But the problemsets might contain different number of problems in each one, which looks unfair.

Since Francis is a fair tutor, he decided to move some problems from problemset to another problemset (he can do this multiple times), until all problemsets contain the same number of problems.

Sometimes it's impossible to do so, and he might need to delete some problems completely before moving any problem, then he will start moving the problems. He needs your help to write a program to calculate the minimum number of problems to be deleted, and the minimum number of problems to be moved.

Input Format:
First line of the input contains one integer N (1 <= N <= 100) representing the number of problemsets and the number of trainees.
Second line of the input contains N non-negative integers separated by a single space, representing the number of problems in each problemset. Each problemset will contain at most 100 problems.

Output Format:
Output a single line which will contain the minimum number of problems to be deleted, followed by a space then the minimum number of problems to be moved.
Refer sample input and output for formatting specifications.

Sample Input 1:
3
3 3 3

Sample Output 1:
0 0

Sample Input 2:
4

6 4 5 3

Sample Output 2:
2 1

16.Seven Segment Display

The Event Organizing Company "Buzzcraft" wanted to procure seven segment displays to display any numeric information display boards, scrolling ad banners, etc., to place it in their Events. The Company contracted out their order to MDC team at Orange labs who designs embedded sensing nodes and provides connectivity to tie them to the internet of things.

They are working on building seven segment displays. But the Company wanted to know how many seven segment displays will they need to represent an Integer **x**. They use one seven segment display to represent one digit of an Integer. For example: Integer "100" needs "3" seven segment boards to be represented.

Help them find out how many displays are needed?

Input Format:
First and only line consists of one positive integer that needs to be represented using seven segment displays.

Output Format:
Output a single line containing the number of digits of that integer.
Refer sample input and output for formatting specifications.

Sample Input 1:
1

Sample Output 1:
1

Sample Input 2:
1000

Sample Output 2:
4

17.Series 1

The Event Organizing Company "Buzzcraft" focuses event management in a way that creates a win-win situation for all involved stakeholders. Buzzcraft don't look at building one time associations with clients, instead, aim at creating long-lasting collaborations that will span years to come. This goal of the company has helped them evolve and gain more clients within notable time.
The number of clients of the company from the start day of their journey till now is recorded sensibly and is seemed to have followed a specific series like:
2,3,5,7,11,13,17,19, 23 ...

Write a program which takes an integer N as the input and will output the series till the Nth term.

Input Format:

First line of the input is an integer N.

Output Format:

Output a single line the series till Nth term, each separated by a comma.
Refer sample input and output for formatting specifications.

Sample Input 1:

5

Sample Output 1:

2 3 5 7 11

Sample Input 2:

10

Sample Output 2:

2 3 5 7 11 13 17 19 23 29

18.Series 2

The Event Organizing Company "Buzzcraft" focuses event management in a way that creates a win-win situation for all involved stakeholders. Buzzcraft don't look at building one time associations with clients, instead, aim at creating long-lasting collaborations that will span years to come. This goal of the company has helped them evolve and expand big with more workforces within notable time.
The number of employees of the company from the start day of their journey till now is recorded sensibly and is seemed to have followed a specific series like: 20, 60, 104, 152, 204,…….

Write a program which takes an integer N as the input and will output the series till the Nth term.

Input Format:
First line of the input is an integer N.

Output Format:
Output a single line the series till Nth term, each separated by a comma.
Refer sample input and output for formatting specifications.

Sample Input 1:
5

Sample Output 1:
20 60 104 152 204

Sample Input 2:
10

Sample Output 2:
20 60 104 152 204 260 320 384 452 524

19.Series 3

The Event Organizing Company "Buzzcraft" focuses event management in a way that creates a win-win situation for all involved stakeholders. Buzzcraft don't look at building one time associations with clients, instead, aim at creating long-lasting collaborations that will span years to come. This goal of the company has helped them evolve and expand big with organizing many events till date.
The number of events that the company organizes every month is recorded sensibly and is seemed to have followed a specific series like: 30, 35, 38, 41, 54, 53 ...

Write a program which takes an integer N as the input and will output the series till the Nth term.

Input Format:
First line of the input is an integer N.

Output Format:
Output a single line the series till Nth term, each separated by a comma.
Refer sample input and output for formatting specifications.

Sample Input 1:
5

Sample Output 1:
30 35 38 41 54

Sample Input 2:
10

Sample Output 2:
30 35 38 41 54 53 78 71 110 95

20.Hollow Pyramid

The much awaited event at the entertainment industry every year is the "Screen Awards". This year the event is going to be organized on December 25 to honour the Artists for their professional excellence in Cinema. The Organizers of the event, J&R Events, decided to design some attractive and LED Matrix panel boards for the show promotions all across the venue.

The Event organizers wanted to program the display boards with some specific pattern using alphabets and special characters. Help them write a program to design the pattern of a hollow pyramid in the matrix panel, given the number of lines of the pattern.

Input Format:
First line of the input is an integer that refers to the number of lines in the pattern.

Output Format:
Output the pattern as given in the output.
Refer sample input and output for formatting specifications.

Sample Input 1:
4

Sample Output 1:
```
bbb*bbb
bb*i*bb
b*iii*b
*******
```

Sample Input 2:
5

Sample Output 2:
```
bbbb*bbbb
bbb*i*bbb
bb*iii*bb
b*iiiii*b
*********
```