

# Even Semiprime Runs

A **semiprime** is a product of two primes such as  $9 = 3 \times 3$  or  $580519 = 41 \times 14159$ .

The first ten semiprimes are  $4$ ,  $6$ ,  $9$ ,  $10$ ,  $14$ ,  $15$ ,  $21$ ,  $22$ ,  $25$ , and  $26$ .

A **run** of semiprimes is a contiguous subsequence of semiprimes. For example,  $15$ ,  $21$ ,  $22$  is a run but  $9$ ,  $14$ ,  $15$  is not because it skips over  $10$ .

An **even run** of semiprimes is a run that contains only even numbers. The first even run of length  $3$  is  $454$ ,  $458$ ,  $466$ .

Your task is to find the longest even run of semiprimes between  $N$  and  $M$ , inclusive.

## Input

The first line contains  $T$  ( $1 \leq T \leq 20$ ), the number of test cases.

Each test case is one line containing the integers  $N$  and  $M$  ( $1 \leq N \leq M \leq 10^{14}$ ,  $M - N \leq 10^7$ ).

The sum of the differences  $M - N$  over all test cases is at most  $10^7$ .

## Output

Print two lines per test case. On the first line, print the length of the longest even run of semiprimes. On the second line, print the numbers in the run.

If there are multiple solutions, print the one with the smallest first number.

It is guaranteed that there is at least one even semiprime between  $N$  and  $M$ .

## Example

### Input:

```
16
4 4
4 6
4 8
4 14
6 10
58 62
1 100
1 1000
1 10000
1 100000
1 1000000
5000000 10000000
247425787142 247425787222
247425000000 247425787221
466937174866 466937199999
99999999000000 100000000000000
```

### Output:

1  
4  
2  
4 6  
2  
4 6  
2  
4 6  
1  
6  
2  
58 62  
2  
4 6  
3  
454 458 466  
3  
454 458 466  
3  
454 458 466  
5  
111614 111626 111634 111638 111646  
5  
5161318 5161322 5161334 5161342 5161346  
8  
247425787142 247425787162 247425787166 247425787174 247425787178 247425787198 247425787214 247425787222  
7  
247425787142 247425787162 247425787166 247425787174 247425787178 247425787198 247425787214  
4  
466937176054 466937176058 466937176066 466937176078  
4  
99999999199498 99999999199502 99999999199522 99999999199558

## Note

This problem was inspired by [Zak Seidov's post](#) in the SeqFan mailing list.