

Week 1 Live Coding Solution

Week 1 Live Coding Solution

Live Coding Problem 1
Solution

Live Coding Problem 2
Solution

Live Coding Problem 3
Solution

Live Coding Problem 1

A positive integer m is a prime product if it can be written as $p \times q$, where p and q are both primes. .

Write a Python function **prime_product(m)** that takes an integer m as input and returns `True` if m is a prime product and `False` otherwise. (If m is not positive, function should return `False`.)

Sample Input

```
1 | 6
```

Output

```
1 | True
```

Solution

```
1  # Solution
2  def factors(n):
3      factorlist = []
4      for i in range(1,n+1):
5          if n%i == 0:
6              factorlist.append(i)
7      return(factorlist)
8  def isprime(n):
9      return(factors(n) == [1,n])
10
11 def prime_product(n):
12     for i in range(1,n+1):
13         if n%i == 0:
14             if isprime(i) and isprime(n//i):
15                 return(True)
16     return(False)
17
18
19
20 # suffix (visible)
21 n = int(input())
22 print(prime_product(n))
```

Public Test case

Input 1

```
1 | 6
```

Output

```
1 | True
```

Input 2

1 | 12

Output

1 | False

Input 3

1 | 58

Output

1 | True

Private Test case

Input 1

1 | 35

Output

1 | True

Input 2

1 | 100

Output

1 | False

Input 3

1 | -12

Output

1 | False

Input 4

1 | 77

Output

Live Coding Problem 2

Write a function **del_char(s,c)** that takes strings **s** and **c** as input, where **c** has length 1 (i.e., a single character), and returns the string obtained by deleting all occurrences of **c** in **s**. If **c** has length other than 1, the function should return **s**.

Sample input-1

```
1 | banana
2 | b
```

Output

```
1 | anana
```

Sample input-2

```
1 | banana
2 | an
```

Output

```
1 | banana
```

Solution

```
1 | # Solution
2 | def del_char(s,c):
3 |     if len(c) != 1:
4 |         return(s)
5 |     snw = ""
6 |     for char in s:
7 |         if char != c:
8 |             snw = snw + char
9 |     return(snw)
10 |
11 |
12 | # Suffix (visible)
13 | s = input()
14 | c = input()
15 | print(del_char(s,c))
```

Public Test case

Input 1

```
1 | banana
2 | b
```

Output

```
1 | anana
```

Input 2

```
1 | banana
2 | an
```

Output

```
1 | banana
```

Input 3

```
1 | data structure
2 | u
```

Output

```
1 | data strctre
```

Private Test case

Input 1

```
1 | this is pdsa course
2 | s
```

Output

```
1 | thi i pda coure
```

Input 2

```
1 | this is pdsa course
2 | is
```

Output

```
1 | this is pdsa course
```

Input 3

```
1 | data structure
2 | a
```

Output

```
1 | dt structure
```

Input 4

```
1 | apple
2 | p
```

Output

```
1 | ale
```

Live Coding Problem 3

Write a function **shuffle(l1,l2)** that takes two lists, **l1** and **l2** as input, and returns a list consisting of the first element in **l1**, then the first element in **l2**, then the second element in **l1**, then the second element in **l2**, and so on. If the two lists are not of equal length, the remaining elements of the longer list are appended at the end of the shuffled output.

Sample Input

```
1 [0,2,4]
2 [1,3,5]
```

Output

```
1 [0, 1, 2, 3, 4, 5]
```

Sample Input

```
1 [0,2,4]
2 [1]
```

Output

```
1 [0, 1, 2, 4]
```

Solution

```
1 # solution
2 def shuffle(l1,l2):
3     if len(l1) < len(l2):
4         minlength = len(l1)
5     else:
6         minlength = len(l2)
7     shuffled = []
8     for i in range(minlength):
9         shuffled.append(l1[i])
10        shuffled.append(l2[i])
11    shuffled = shuffled + l1[minlength:] + l2[minlength:]
12    return(shuffled)
13
14
15 # Suffix code (visible)
16 L1 = eval(input())
17 L2 = eval(input())
18 print(shuffle(L1,L2))
```

Public Test case

Input 1

```
1 | [0,2,4]
2 | [1,3,5]
```

Output

```
1 | [0, 1, 2, 3, 4, 5]
```

Input 2

```
1 | [0,2,4]
2 | [1]
```

Output

```
1 | [0, 1, 2, 4]
```

Input 3

```
1 | [0]
2 | [1,3,5]
```

Output

```
1 | [0, 1, 3, 5]
```

Private Test case

Input 1

```
1 | [1,3,5,7,9]
2 | [2,4,6,8,10]
```

Output

```
1 | [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]
```

Input 2

```
1 | [1,3,5,7,9]
2 | [1,3,5,7,9]
```

Output

```
1 | [1, 1, 3, 3, 5, 5, 7, 7, 9, 9]
```

Input 3

| | |
|---|-------------|
| 1 | [1,3,5,7,9] |
| 2 | [2] |

Output

| | |
|---|--------------------|
| 1 | [1, 2, 3, 5, 7, 9] |
|---|--------------------|

Input 4

| | |
|---|-------------------|
| 1 | [2] |
| 2 | [2,3,4,5,6,7,8,9] |

Output

| | |
|---|-----------------------------|
| 1 | [2, 2, 3, 4, 5, 6, 7, 8, 9] |
|---|-----------------------------|

Week 2 Live Coding Solution

Week 2 Live Coding Solution

Live Coding Problem 1

Solution Code

Public Test case

Live Coding-Problem 2

Solution Code

Public Testcase

Live Coding-Problem 3

Solution Code

Public Testcase

Private Testcase

Live Coding-Problem 4

Solution Code

Public Testcase

Private Testcase

Live Coding Problem 1

Write a function `Findpeak(L)` that accepts a list `L` of `n` distinct elements and returns the peak element of the list. A list element is a peak if it is greater than its neighbors. For corner elements, we need to consider only one neighbor. Write a solution of $O(\log n)$ complexity. Consider that there is only one peak in the list, `L`.

Sample Input 1

```
1 | [5, 10, 20, 15]
```

Output

```
1 | 20
```

Sample Input 2

```
1 | [1,2,3,4,5,6,7,8]
```

Output

```
1 | 8
```

Solution Code

Solution Code

```
1 def findPeakUtil(arr, low, high, n):
2     mid = low + (high - low)/2
3     mid = int(mid)
4
5     if ((mid == 0 or arr[mid - 1] < arr[mid]) and (mid == n - 1 or arr[mid +
6 1] < arr[mid])):
7         return arr[mid]
8
9     elif (mid > 0 and arr[mid - 1] > arr[mid]):
10        return findPeakUtil(arr, low, (mid - 1), n)
11    else:
12        return findPeakUtil(arr, (mid + 1), high, n)
13
14 def Findpeak(L):
15     n = len(L)
16     return findPeakUtil(L,0,n-1,n)
```

Suffix code(visible)

```
1 L = eval(input())
2 res = Findpeak(L)
3 print(res)
```

Public Test case

Input 1

1 | [5, 10, 20, 15]

Output

1 | 20

Input 2

1 | [1,2,3,4,5,6,7,8]

Output

1 | 8

Input 3

1 | [1,2,3,4,5,6,7,8,7,6]

Output

1 | 8

Input 4

1 | [7,6,5,4,3,2,1]

Output

1 | 7

Note:- Some test cases are very big to check the efficiency of the solution code for this problem because of that, these test cases are not included in the solution file.

Live Coding-Problem 2

Write a Python function `findCommonElements(L1, L2)` that accepts two integer lists `L1` and `L2` of same length `n` and return a list that contains elements that are common to both lists. Write a efficient solution that runs in $O(n \log n)$ time.

- `L1` contains all distinct integers and `L2` contains all distinct integers, but there can be many elements common between `L1` and `L2`.
- Returned list contains all elements that are common to `L1` and `L2`. The elements in the returned list can be in any order.

For example.

if `L1 = [5, 8, 2]` and `L2 = [6, 8, 1]` then, `findCommonElements(L1, L2)` should return list `[8]`.

if `L1 = [3, 7, 2, 9, 5]` and `L2 = [6, 3, 7, 5, 4]` then, `findCommonElements(L1, L2)` should return list `[3, 7, 5]`.

Elements in returned list can be in any order.

Do not use Python set built-in function

Sample input

```
1 [23, 24, 18, 22, 20, 10, 17, 12, 16, 19, 21, 15, 14, 11, 13]
2 [23, 22, 33, 24, 31, 21, 20, 26, 30, 29, 25, 27, 28, 34, 32]
```

Output

```
1 [20, 21, 22, 23, 24]
```

Sample input 2

```
1 [3, 7, 2, 9, 5]
2 [6, 3, 7, 5, 4]
```

Output

```
1 [3, 5, 7]
```

Solution Code

Solution Code

```
1 def binarySearch(L, k):
2     s = len(L)
3     if(s < 1):
4         return False
5     left = 0
6     right = s - 1
```

```

7     while(left <= right):
8         mid = (left + right)//2
9         if (k == L[mid]):
10            return True
11        elif (k < L[mid]):
12            right = mid - 1
13        else:
14            left = mid + 1
15    return False
16 def findCommonElements(L1, L2):
17     L1.sort()
18     L3 = []
19     for item in L2:
20         if (binarySearch(L1, item) == True):
21             L3.append(item)
22     return L3
23

```

Suffix Code(Visible)

```

1 A = eval(input())
2 B = eval(input())
3 result = findCommonElements(A, B)
4 result.sort()
5 print(result)

```

Public Testcase

Input 1

```

1 [23, 24, 18, 22, 20, 10, 17, 12, 16, 19, 21, 15, 14, 11, 13]
2 [23, 22, 33, 24, 31, 21, 20, 26, 30, 29, 25, 27, 28, 34, 32]

```

Output

```

1 [20, 21, 22, 23, 24]

```

Input 2

```

1 [3, 7, 2, 9, 5]
2 [6, 3, 7, 5, 4]

```

Output

```

1 [3, 5, 7]

```

Note:- Some test cases are very big to check the efficiency of the solution code for this problem because of that, these test cases are not included in the solution file.

Live Coding-Problem 3

You have a deck of shuffled cards ranging from 0 to 100,000,000. There are 2 sub-ordinate below you and two subordinates below them and it goes on.

- The job of the sub-ordinate is to split the deck of cards that they received and give it to two sub-ordinate of them. If they receive a deck of cards from their subordinates, they merge it in an ascending order and give it their higher level.
- If a subordinate received only two card, then he/she himself/herself arrange in ascending order give it back that to the superior.
- If a subordinate received only one card, then he/she will give back that to the superior.

```
1 Terminology:
2
3 (67) subordinate number 67
4
5 [1, 3, 5, 2] -> [1, 2, 3, 5] deck of cards got -> deck of cards returned
6
7 -----
8
9 (0) [3, 1, 2, 0, 5] -> [0, 1, 2, 3, 5]
10 |
11 |--(1) [3, 1] -> [1, 3]
12 |
13 |--(2) [2, 0, 5] -> [0, 2, 5]
14 |
15 |--(3) [2] -> [2]
16 |
17 |--(4) [0, 5] -> [0, 5]
```

Your task is to find how many people (including you) are required to sort the cards and print the sorted deck of cards and number of people required as a tuple.

Write the function **def subordinates(L):**

```
1 def subordinates(L):
```

Sample input 1

```
1 [194, 69, 103, 150, 151, 44, 103, 98]
```

Output

```
1 ([44, 69, 98, 103, 103, 150, 151, 194], 7)
```

Sample input 2

```
1 [10, 33, 45, 67, 92, 100, 5]
```


Output

```
1 | ([5, 10, 33, 45, 67, 92, 100], 7)
```

Solution Code

Solution Code

```
1 | def merge(A, B):
2 |     m, n = len(A), len(B)
3 |     C, i, j, k = [], 0, 0, 0
4 |     while k < m + n:
5 |         if i == m:
6 |             C.extend(B[j:])
7 |             k = k + n - j
8 |         elif j == n:
9 |             C.extend(A[i:])
10 |            k = k + m - i
11 |        elif A[i] < B[j]:
12 |            C.append(A[i])
13 |            i, k = i + 1, k + 1
14 |        else:
15 |            C.append(B[j])
16 |            j, k = j + 1, k + 1
17 |    return C
18 |
19 | def mergesort(L):
20 |     global c
21 |     c += 1
22 |     n = len(L)
23 |     if n == 2:
24 |         return L if L[0] < L[1] else L[::-1]
25 |     if n <= 1:
26 |         return L
27 |     m = n//2
28 |     l = mergesort(L[:m])
29 |     r = mergesort(L[m:])
30 |
31 |     L_ = merge(l, r)
32 |
33 |     return L_
34 |
35 | def subordinates(L):
36 |     return mergesort(L), c
37 | c=0
```

Suffix code(Visible)

```
1 | print(subordinates(eval(input())))
```

Public Testcase

Input 1

```
1 | [10, 33, 45, 67, 92, 100, 5, 99, 105]
```

Output

```
1 | ([5, 10, 33, 45, 67, 92, 99, 100, 105], 9)
```

Input 2

```
1 | [194, 69, 103, 150, 151, 44, 103, 98]
```

Output

```
1 | ([44, 69, 98, 103, 103, 150, 151, 194], 7)
```

Input 3

```
1 | [10, 33, 45, 67, 92, 100, 5]
```

Output

```
1 | ([5, 10, 33, 45, 67, 92, 100], 7)
```

Private Testcase

Input 1

```
1 | [10, 33, 45, 67, 92, 100, 5, 99, 105, 26, 201]
```

Output

```
1 | ([5, 10, 26, 33, 45, 67, 92, 99, 100, 105, 201], 13)
```

Input 2

```
1 | [10, 33, 45, 67, 92, 100, 5, 99, 105, 26]
```

Output

```
1 | ([5, 10, 26, 33, 45, 67, 92, 99, 100, 105], 11)
```

Input 3

```
1 [136, 152, 147, 3, 14, 43, 162, 169, 5, 10, 108, 182, 98, 71, 25, 122, 86,
  82, 25, 176, 53, 14, 53, 85, 25, 110, 41, 5, 46, 168, 192, 140, 82, 109, 37,
  165, 41, 146, 48, 123, 166, 17, 85, 87, 118, 133, 108, 170, 119, 198, 53,
  154, 55, 193, 129, 189, 77, 69, 87, 80, 23, 58, 48, 79, 12, 4, 66, 30, 182,
  118, 89, 140, 89, 15, 169, 101, 172, 0, 53, 24, 149, 168, 106, 41, 49, 148,
  151, 88, 95, 192, 7, 101, 50, 40, 196, 72]
```

Output

```
1 ([0, 3, 4, 5, 5, 7, 10, 12, 14, 14, 15, 17, 23, 24, 25, 25, 25, 30, 37, 40,
  41, 41, 41, 43, 46, 48, 48, 49, 50, 53, 53, 53, 53, 55, 58, 66, 69, 71, 72,
  77, 79, 80, 82, 82, 85, 85, 86, 87, 87, 88, 89, 89, 95, 98, 101, 101, 106,
  108, 108, 109, 110, 118, 118, 119, 122, 123, 129, 133, 136, 140, 140, 146,
  147, 148, 149, 151, 152, 154, 162, 165, 166, 168, 168, 169, 169, 170, 172,
  176, 182, 182, 189, 192, 192, 193, 196, 198], 127)
```

Input 4

```
1 [147, 3, 14, 43, 162, 169, 5, 10, 108, 182, 98, 71, 25, 122, 86, 82, 25, 176,
  53, 14, 53, 85, 25, 110, 41, 5, 46, 168, 192, 140, 82, 109, 37, 165, 41, 146,
  48, 123, 166, 17, 85, 87, 118, 133, 108, 170, 119, 198, 53, 154, 55, 193,
  129, 189, 77, 69, 87, 80, 23, 58, 48, 79, 12, 4, 66, 30, 182, 118, 89, 140,
  89, 15, 169, 101, 172, 0, 53, 24, 149, 168, 106, 41, 49, 148, 151, 88, 95,
  192, 7, 101, 50, 40]
```

Output

```
1 ([0, 3, 4, 5, 5, 7, 10, 12, 14, 14, 15, 17, 23, 24, 25, 25, 25, 30, 37, 40,
  41, 41, 41, 43, 46, 48, 48, 49, 50, 53, 53, 53, 53, 55, 58, 66, 69, 71, 77,
  79, 80, 82, 82, 85, 85, 86, 87, 87, 88, 89, 89, 95, 98, 101, 101, 106, 108,
  108, 109, 110, 118, 118, 119, 122, 123, 129, 133, 140, 140, 146, 147, 148,
  149, 151, 154, 162, 165, 166, 168, 168, 169, 169, 170, 172, 176, 182, 182,
  189, 192, 192, 193, 198], 119)
```

Live Coding-Problem 4

Given a list `L` of random numbers and another number `pairSum`, find whether there exists two numbers in the list such that their sum is equal to `pairSum`.

Write a Python function **`findPair(L, pairSum)`** that return `True` if there exist a pair of integers in `L` whose sum is equal to `x`, `False` otherwise.. Try to write a solution which is $O(n \log n)$ or better.

Hint: Try to sort the list first.

For example consider the below list. We need to find if there exists any pair whose sum is equal to 21. $11 + 10 = 21$. So the function should return `True`.

For the same list if we want to find if there exist any pair whose sum is equal to 2. Clearly there is no such pair so the function should return `False`.

Sample Input 1

```
1 | 10 4 11 5 1 8 7
2 | 21
```

Sample Output 1

```
1 | True
```

Sample Input 2

```
1 | 10 4 11 5 1 8 7
2 | 2
```

Sample Output 2

```
1 | False
```

Solution Code

Solution Code

```
1 | def findPair(L, x):
2 |     L.sort()
3 |     left = 0
4 |     right = len(L) - 1
5 |     while(left < right):
6 |         sum = L[left] + L[right]
7 |         if (sum == x):
8 |             return True
9 |         elif (sum > x):
10 |             right -= 1
11 |         else:
12 |             left += 1
13 |     return False
```

Suffix Code(Visible)

```
1 L = [int(item) for item in input().split()]
2 pairsum = int(input())
3 print(findPair(L, pairsum))
```

Public Testcase

Input 1

```
1 3825 29286 12635 73450 69276 1052 67615 27144 32660
2 3825
```

Output

```
1 False
```

Input 2

```
1 3825 29286 12635 73450 69276 1052 67615 27144 32660
2 33111
```

Output

```
1 True
```

Input 3

```
1 3825 29286 12635 73450 69276 1052 67615 27144 32660
2 102736
```

Output 3

```
1 True
```

Input 4

```
1 7625 33422 45912 24600 38030 64596 35281 49247 808 45679 38388 37078 7997
  43351 81537 87537 17318 9801
2 41047
```

Output

```
1 True
```

Private Testcase

Input 1

```
1 | 7625 33422 45912 24600 38030 64596 35281 49247 808 45679 38388 37078 7997
   | 43351 81537 87537 17318 9801
2 | 79334
```

Output

```
1 | True
```

Input 2

```
1 | 7625 33422 45912 24600 38030 64596 35281 49247 808 45679 38388 37078 7997
   | 43351 81537 87537 17318 9801
2 | 71452
```

Output

```
1 | True
```

Input 3

```
1 | 7625 33422 45912 24600 38030 64596 35281 49247 808 45679 38388 37078 7997
   | 43351 81537 87537 17318 9801 57304 41499 75008 80402 15792 8367 28861 10894
   | 26350 27407 99522 30410 89571 41049 97045 83297 26106 70244 48446 61643 77322
   | 62453 70568 77003 84457 52794 6887 21907 28722 38845 2772 20660 54014 77490
   | 85218
2 | 42168
```

Output

```
1 | True
```

Input 4

```
1 | 7625 33422 45912 24600 38030 64596 35281 49247 808 45679 38388 37078 7997
   | 43351 81537 87537 17318 9801 57304 41499 75008 80402 15792 8367 28861 10894
   | 26350 27407 99522 30410 89571 41049 97045 83297 26106 70244 48446 61643 77322
   | 62453 70568 77003 84457 52794 6887 21907 28722 38845 2772 20660 54014 77490
   | 85218
2 | 42000
```

Output

```
1 | False
```

Week 3 Live Coding Solutions

Week 3 Live Coding Solutions

Week 3 - Live Coding Problem 1

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Week 3 - Live Coding Problem 2

[Solution](#)

[Public test case](#)

[Private test case](#)

Week 3 - Live Coding Problem 3

[Solution](#)

[Public test case](#)

[Private test case](#)

Week 3 - Live Coding Problem 1

A **queue** is a data structure in which whatever comes first will go out first. It follows the FIFO (First-In-First-Out) policy. In Queue, the insertion is done from one end known as the rear end of the queue, whereas the deletion is done from another end known as the front end of the queue.

For a given class **Queue**, create two methods:

- **Enqueue(data):** that accepts an integer `data` and inserts it into the queue in the last position.
- **Dequeue():** if queue is empty, returns `None`. Otherwise, delete one element of the queue from the first position and returns deleted element value.

Note- Use given linked list structure for implementation.

```
1 class Node:
2     def __init__(self, data):
3         self.data = data # store data
4         self.next = None #point to the next node
5 class Queue:
6     def __init__(self):
7         self.head = None # point to the first node of the list
8         self.last = None # point to the last node of the list
```

Sample input

```
1 [2,4,6,8,10] #elements for insert in queue
2 3 # remove 3 elements from queue
```

Output

```
1 2 # first removed element from queue
2 4 # second removed element from queue
3 6 # third removed element from queue
4 8, 10 #remaining elements in queue
```

Solution

Prefix Code(Visible)

```
1 class Node:
2     def __init__(self, data):
3         self.data = data
4         self.next = None
5 class Queue:
6     def __init__(self):
7         self.head = None
8         self.last = None
```

Solution code

```
1
2     def Enqueue(self, data):
3         newnode = Node(data)
4         if self.head == None:
5             self.head = newnode
6             self.last = newnode
7         else:
8             self.last.next = newnode
9             self.last = newnode
10
11     def Dequeue(self):
12         if(self.head != None):
13             item = self.head.data
14             if self.head == self.last:
15                 self.head=None
16                 self.last=None
17             else:
18                 self.head = self.head.next
19             return item
20
```

Suffix Code(hidden)

```
1     def traverse(self):
2         temp = self.head
3         if temp != None:
4             while temp != None:
5                 if temp.next != None:
6                     print(temp.data, end=',')
7                 else:
8                     print(temp.data)
```



```

9         temp = temp.next
10     else:
11         print('None')
12
13     ins = eval(input())
14     delt=int(input())
15     A = Queue()
16     for i in ins:
17         A.Enqueue(i)
18     for j in range(delt):
19         print(A.Dequeue())
20     A.traverse()

```

Public Test case

Input 1

```

1  [1,2,3,4,5,6,7]
2  3

```

Output

```

1  1
2  2
3  3
4  4,5,6,7

```

Input 2

```

1  [1,2,3,4,5,6]
2  2

```

Output

```

1  1
2  2
3  3,4,5,6

```

Input 3

```

1  [10,20,30,40,50]
2  5

```

Output

| | |
|---|------|
| 1 | 10 |
| 2 | 20 |
| 3 | 30 |
| 4 | 40 |
| 5 | 50 |
| 6 | None |

Private Test case

Input 1

| | |
|---|------------|
| 1 | [10,20,30] |
| 2 | 4 |

Output

| | |
|---|------|
| 1 | 10 |
| 2 | 20 |
| 3 | 30 |
| 4 | None |
| 5 | None |

Input 2

| | |
|---|----|
| 1 | [] |
| 2 | 1 |

Output

| | |
|---|------|
| 1 | None |
| 2 | None |

Input 3

| | |
|---|-----------------|
| 1 | [5,5,5,5,5,5,5] |
| 2 | 5 |

Output

| | |
|---|-------|
| 1 | 5 |
| 2 | 5 |
| 3 | 5 |
| 4 | 5 |
| 5 | 5,5,5 |

Input 4

| | |
|---|----------------------------|
| 1 | [2,3,6,8,9,10,45,67,99,50] |
| 2 | 5 |

Output

```
1 | 2
2 | 3
3 | 6
4 | 8
5 | 9
6 | 10,45,67,99,50
```

Week 3 - Live Coding Problem 2

A **doubly linked list** is a linked data structure that consists of a set of sequentially linked records called nodes. Each node contains three fields: two link fields (references to the previous and to the next node in the sequence of nodes) and one data field. So, it can be traversed in both directions.

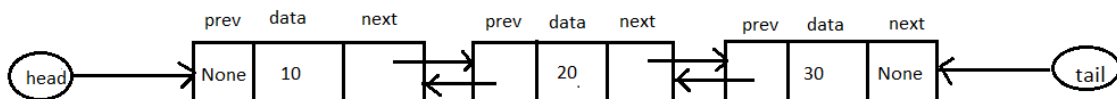
For the given class **doubly_linked_list**, create one methods:

- **insert_at_pos(data,pos):** that accepts an integer `data` and inserts it into the list at given `pos` position where `1 < pos <= length(list)`

Note- Use given linked list structure to implementation.

```
1 class Node:
2     def __init__(self, data):
3         self.data = data # Stores data
4         self.next = None # Contains the reference of next node
5         self.prev = None # Contains the reference of previous node
6 class doubly_linked_list:
7     def __init__(self):
8         self.head = None # Contains the reference of first node of the list
9         self.last = None # Contains the reference of the last node of the
    list
```

Example



Sample Input

```
1 [1,3,5,7,9] # Elements for insert in list one by one, start from 1
2 20 # data
3 2 # position
```

Output

```
1 1,20,3,5,7,9 # Traversed list from head to last
2 9,7,5,3,20,1 # Traversed list from last to head
```

Solution

Prefix Code(Visible)

```
1 class Node:
2     def __init__(self, data):
3         self.data = data
4         self.next = None
5         self.prev = None
6 class doubly_linked_list:
7     def __init__(self):
8         self.head = None
9         self.last = None
10
11     def insert_end(self,data):
12         newnode = Node(data)
13         newnode.prev = self.last
14         if self.head == None:
15             self.head = newnode
16             self.last = newnode
17         else:
18             self.last.next = newnode
19             self.last = newnode
```

Solution code

```
1     def insert_at_pos(self,data,pos):
2         newnode = Node(data)
3         c = 1
4         temp = self.head
5         while c < pos-1:
6             temp = temp.next
7             c += 1
8         temp1 = temp.next
9         temp.next = newnode
10        newnode.next = temp1
11        newnode.prev = temp
12        temp.next=newnode
13        temp1.prev=newnode
14
```

Suffix code(hidden)

```
1     def traverse(self):
2         temp = self.head
3         while temp != None:
```

```

4         if temp.next != None:
5             print(temp.data, end=',')
6         else:
7             print(temp.data)
8         temp = temp.next
9
10    def traverse_rev(self):
11        temp = self.last
12        while temp != None:
13            if temp.prev != None:
14                print(temp.data, end=',')
15            else:
16                print(temp.data)
17            temp = temp.prev
18
19    ins = eval(input())
20    data = int(input())
21    pos=int(input())
22    A = doubly_linked_list()
23    for i in ins:
24        A.insert_end(i)
25    A.insert_at_pos(data,pos)
26    A.traverse()
27    A.traverse_rev()

```

Public test case

Input 1

```

1  [1,3,5,7,9]
2  20
3  2

```

Output

```

1  1,20,3,5,7,9
2  9,7,5,3,20,1

```

Input 2

```

1  [10,20,30,40,50,60]
2  15
3  2

```

Output

```

1  10,15,20,30,40,50,60
2  60,50,40,30,20,15,10

```

Input 3

| | |
|---|---------------------|
| 1 | [10,20,30,40,50,60] |
| 2 | 55 |
| 3 | 6 |

Output

| | |
|---|----------------------|
| 1 | 10,20,30,40,50,55,60 |
| 2 | 60,55,50,40,30,20,10 |

Private test case

Input 1

| | |
|---|------------------------|
| 1 | [10,20,30,40,30,20,10] |
| 2 | 50 |
| 3 | 5 |

Output

| | |
|---|-------------------------|
| 1 | 10,20,30,40,50,30,20,10 |
| 2 | 10,20,30,50,40,30,20,10 |

Input 2

| | |
|---|------------------|
| 1 | [4,5,6,7,8,9,10] |
| 2 | 30 |
| 3 | 5 |

Output

| | |
|---|-------------------|
| 1 | 4,5,6,7,30,8,9,10 |
| 2 | 10,9,8,30,7,6,5,4 |

Input 3

| | |
|---|---------------------|
| 1 | [1,2,3,4,5,6,7,8,9] |
| 2 | 10 |
| 3 | 8 |

Output

| | |
|---|----------------------|
| 1 | 1,2,3,4,5,6,7,10,8,9 |
| 2 | 9,8,10,7,6,5,4,3,2,1 |

Input 4

| | |
|---|---------------------|
| 1 | [30,50,56,20,65,90] |
| 2 | 45 |
| 3 | 2 |

Output

| | |
|---|----------------------|
| 1 | 30,45,50,56,20,65,90 |
| 2 | 90,65,20,56,50,45,30 |

Week 3 - Live Coding Problem 3

Implement a Stack using only two Queues. The implemented Stack should support all the functions of a normal stack (`push`, `pop`, `top`, and `isempty`).

Create the following method for given class `stack`.

- `push(data)` insert element `data` to the top of the stack.
- `pop()` If stack is empty return message `Stack is empty`. Otherwise, remove the element from the top of the stack and return it.
- `top()` If stack is empty return message `Stack is empty`. Otherwise, return the element on the top of the stack.
- `isempty()` Returns `True` if the stack is empty, `False` otherwise.

Sample Input

```
1 [10,20,30,40,50] #push one by one
2 2 # pop 2 elemnts
```

Sample Output

```
1 50 #first popped element
2 40 #second popped element
3 30 #top element
4 False #isempty
```

Solution

Prefix Code(Visible)

```
1 class Queue:
2     def __init__(self):
3         self.items = []
4     def enqueue(self, key):
5         self.items.insert(0,key)
6     def dequeue(self):
7         return self.items.pop()
8
9 class stack:
10     def __init__(self):
11         self.q1 = Queue()
12         self.q2 = Queue()
13         self.size = 0
```

Solution Code

```
1     def isempty(self):
2         return (self.size==0)
3     def top(self):
4         if (not self.isempty()):
5             return self.q1.items[-1]
6         else:
```



```

7         return 'Stack is empty'
8     def push(self,data):
9         self.size += 1
10        self.q2.enqueue(data)
11        while (self.q1.items != []):
12            self.q2.enqueue(self.q1.dequeue())
13        self.q = self.q1
14        self.q1 = self.q2
15        self.q2 = self.q
16    def pop(self):
17        if (not self.isempty()):
18            self.size -= 1
19            return self.q1.dequeue()
20        else:
21            return 'Stack is empty'
22

```

Suffix Code(Visible)

```

1 inp = eval(input())
2 dl = int(input())
3 A = stack()
4 for el in inp:
5     A.push(el)
6 for i in range(dl):
7     print(A.pop())
8 print(A.top())
9 print(A.isempty())

```

Public test case

Input 1

```

1 [10,20,30,40,50]
2 2

```

Output

```

1 50
2 40
3 30
4 False

```

Input 2

```

1 [1,2,3,4,5,8,10,45,76,88,99,32,19]
2 5

```

Output

| | | |
|---|--|-------|
| 1 | | 19 |
| 2 | | 32 |
| 3 | | 99 |
| 4 | | 88 |
| 5 | | 76 |
| 6 | | 45 |
| 7 | | False |

Input 3

| | | |
|---|--|----|
| 1 | | [] |
| 2 | | 1 |

Output

| | | |
|---|--|----------------|
| 1 | | Stack is empty |
| 2 | | Stack is empty |
| 3 | | True |

Private test case

Input 1

| | | |
|---|--|-------------|
| 1 | | [1,2,3,4,5] |
| 2 | | 5 |

Output

| | | |
|---|--|----------------|
| 1 | | 5 |
| 2 | | 4 |
| 3 | | 3 |
| 4 | | 2 |
| 5 | | 1 |
| 6 | | Stack is empty |
| 7 | | True |

Input 2

| | | |
|---|--|---------------------|
| 1 | | [1,2,3,4,5,6,7,8,9] |
| 2 | | 2 |

Output

| | | |
|---|--|-------|
| 1 | | 9 |
| 2 | | 8 |
| 3 | | 7 |
| 4 | | False |

Input 3

```
1 | [1,2,3,4,5]
2 | 1
```

Output

```
1 | 5
2 | 4
3 | False
```

Input 4

```
1 | [1,2,3,4,5]
2 | 6
```

Output

```
1 | 5
2 | 4
3 | 3
4 | 2
5 | 1
6 | Stack is empty
7 | Stack is empty
8 | True
```

Week 4 Live Coding Solutions

Week 4 Live Coding Solutions

Week 4 - Live Coding Problem 1

[Solution Code](#)

[Public Test case](#)

[Private Test case](#)

Week 4 - Live Coding Problem 2

[Solution Code](#)

[Public Test case](#)

[Private Test case](#)

Week 4 - Live Coding Problem 3

[Solution Code](#)

[Public Test case](#)

[Private Test case](#)

Week 4 - Live Coding Problem 1

Shortest Path

The express train routes are provided in the adjacency list `AList`, here you have to find the route from `start` to `end` with minimum number of possible. Write a function `minimumhops(AList, start, end)` to return the cities to be visited starting from `start` to `end`. Return a list with only `start` if the `end` is not reachable.

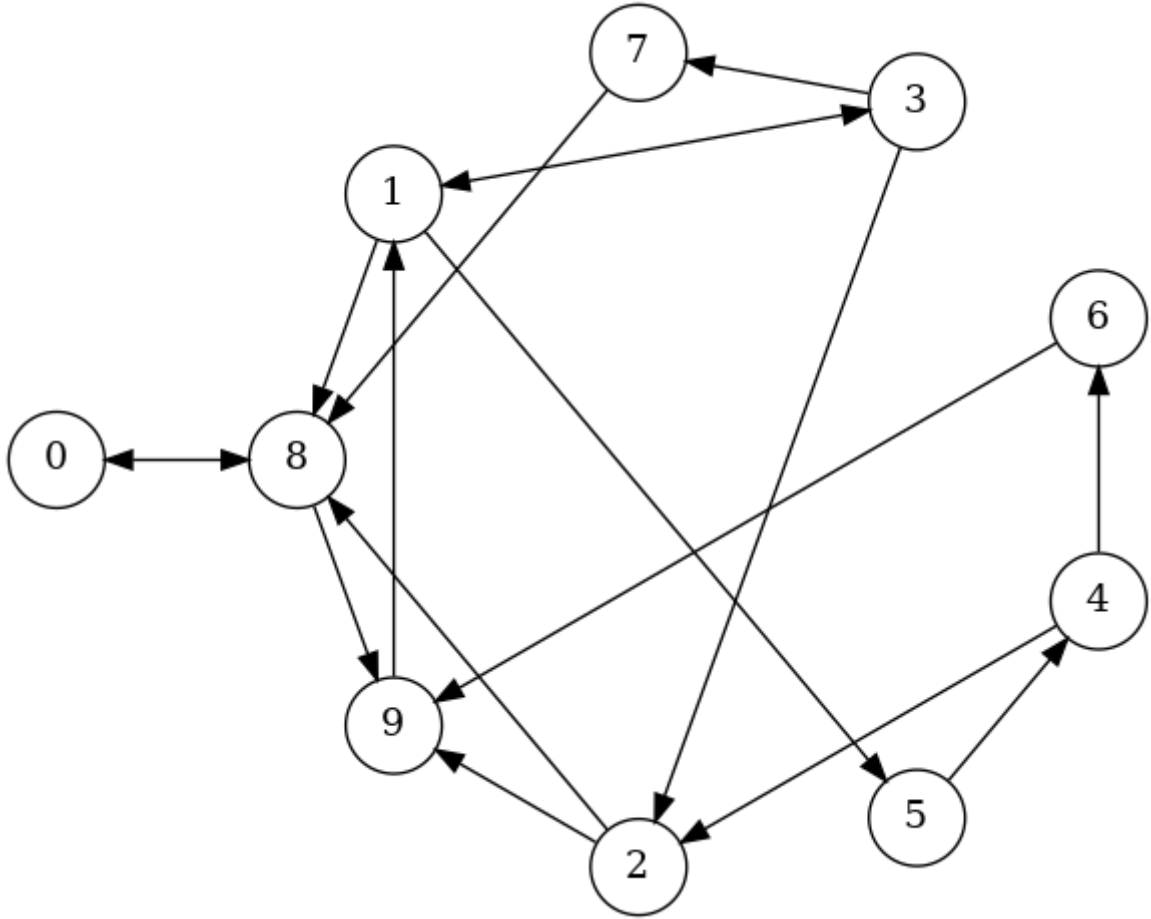
Sample Input

```
1  start = 8
2  end = 7
3  AList = {
4      0: [8],
5      8: [0, 9],
6      1: [3, 5, 8],
7      3: [1, 7, 2],
8      5: [4],
9      2: [8, 9],
10     9: [1],
11     7: [8],
12     4: [2, 6],
13     6: [9]
14 }
```

Sample output

```
1  [8, 9, 1, 3, 7]
```

Graphical representation



Solution Code

```

1 def BFSListPathLevel(AList, v):
2     level, parent = {}, {}
3     for i in AList.keys():
4         level[i] = -1
5         parent[i] = -1
6     q = []
7
8     level[v] = 0
9     q.append(v)
10
11     while len(q) > 0:
12         j = q.pop(0)
13         for k in AList[j]:
14             if level[k] == -1:
15                 level[k] = level[j]+1
16                 parent[k] = j
17                 q.append(k)
18     return level, parent
19
20 def minimumhops(AList, start, end):
21     level, path = BFSListPathLevel(AList, start)
22     shortestpath = []
23     if level[end] != -1:
24         shortestpath.append(end)

```

```

25         while shortestpath[-1] != start:
26             end = path[end]
27             shortestpath.append(end)
28         else:
29             shortestpath.append(start)
30         return shortestpath[::-1]
31

```

Suffix code(Visible)

```

1 start = int(input())
2 end = int(input())
3 AList = eval(input())
4 shortestpath = minimumhops(AList, start, end)
5 print(shortestpath)

```

Public Test case

Input 1

```

1 8
2 0
3 {0: [8], 8: [9], 1: [3, 5, 8], 3: [1, 7, 2], 5: [4], 2: [8, 9], 9: [1], 7:
  [8], 4: [2, 6], 6: [9]}

```

Output

```

1 [8]

```

Input 2

```

1 8
2 7
3 {0: [8], 8: [0, 9], 1: [3, 5, 8], 3: [1, 7, 2], 5: [4], 2: [8, 9], 9: [1], 7:
  [8], 4: [2, 6], 6: [9]}

```

Output

```

1 [8, 9, 1, 3, 7]

```

Input 3

```
1 | 0
2 | 1
3 | {0: [1], 1: [2], 2: [3], 3: [4], 4: [5], 5: [6], 6: [7], 7: [8], 8: [9], 9:
   | [0]}
```

Output

```
1 | [0, 1]
```

Private Test case

Input 1

```
1 | 1
2 | 0
3 | {0: [1], 1: [2], 2: [3], 3: [4], 4: [5], 5: [6], 6: [7], 7: [8], 8: [9], 9:
   | [0]}
```

Output

```
1 | [1, 2, 3, 4, 5, 6, 7, 8, 9, 0]
```

Input 2

```
1 | 1
2 | 0
3 | {0: [1], 1: [2, 3], 2: [3, 4], 3: [4, 5], 4: [5, 6], 5: [6, 7], 6: [7, 8], 7:
   | [8, 9], 8: [9, 0], 9: [0]}
```

Output

```
1 | [1, 2, 4, 6, 8, 0]
```

Input 3

```
1 | 1
2 | 0
3 | {0: [1], 1: [2, 3, 4], 2: [3, 4, 5], 3: [4, 5, 6], 4: [5, 6, 7], 5: [6, 7,
   | 8], 6: [7, 8, 9], 7: [8, 9, 0], 8: [9, 0], 9: [0]}
```

Output

```
1 | [1, 4, 7, 0]
```

Week 4 - Live Coding Problem 2

Back and Forth

Write a function `backandforth(AList, end1, end2)` to return the maximum number of possible route between node `end1` and node `end2` in the undirected graph without going through the same node again with exception to `end1` and `end2`. The connectivity details between nodes are provided by the adjacency list `AList`.

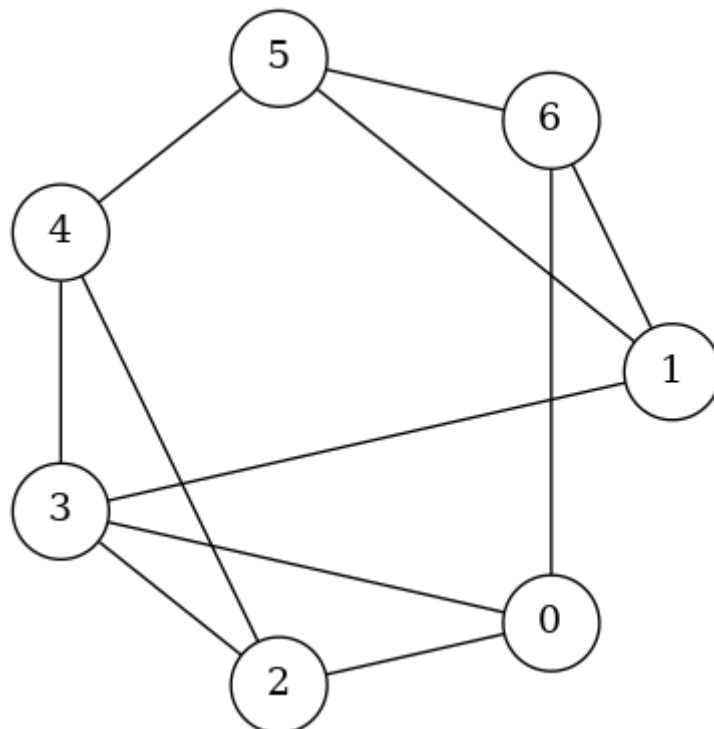
Sample Input

```
1  AList = {  
2    0: [2, 3, 6],  
3    2: [0, 3, 4],  
4    3: [4, 2, 0, 1],  
5    6: [1, 5, 0],  
6    1: [3, 6, 5],  
7    4: [2, 3, 5],  
8    5: [1, 4, 6]  
9  }  
10 end1 = 0  
11 end2 = 1
```

Sample Output

```
1 | 3
```

Graphical Representation



Explanation

The possible paths are [0, 3, 1], [1, 6, 0] and [0, 2, 4, 5, 1]. Hence the answer is 3.

Solution Code

```
1 def BFSListPath(AList, v, preventionList):
2     visited, parent = {}, {}
3     for i in AList.keys():
4         visited[i] = False
5         parent[i] = -1
6     q = []
7
8     visited[v] = True
9     q.append(v)
10
11     while len(q) > 0:
12         j = q.pop(0)
13         for k in AList[j]:
14             if not visited[k] and not k in preventionList:
15                 visited[k] = True
16                 parent[k] = j
17                 q.append(k)
18     return visited, parent
19
20 def findpath(parent, start, end):
21     L = []
22     curr = parent[end]
23     while curr != start:
24         L.append(curr)
25         curr = parent[curr]
26     return L
27
28 def backandforth(AList, end1, end2):
29     preventionList = []
30     c = 0
31     visited, parent = BFSListPath(AList, end1, preventionList)
32     while visited[end2]:
33         c += 1
34         path = findpath(parent, end1, end2)
35         preventionList.extend(path)
36         visited, parent = BFSListPath(AList, end1, preventionList)
37     return c
38
```

Suffix Code

```
1 end1 = int(input())
2 end2 = int(input())
3
4 AList = {}
5
6 while True:
7     line = input()
8     if line.strip() == '':
9         break
10    u, vs = line.strip().split(':')
11    u = int(u)
```

```

12     AList[u] = []
13     for v in vs.strip().split():
14         v = int(v)
15         if v not in AList:
16             AList[v] = []
17         AList[u].append(v)
18
19 print(backandforth(AList, end1, end2))

```

Public Test case

Input 1

```

1 0
2 1
3 0 : 2 3 6
4 1 : 3 5 6
5 2 : 0 3 4
6 3 : 0 1 2 4
7 4 : 2 3 5
8 5 : 1 4 6
9 6 : 0 1 5
10
11

```

Output

```

1 3

```

Input 2

```

1 0
2 1
3 0 : 2 3 6
4 1 : 3 5 6 8
5 2 : 0 3 4 7
6 3 : 0 1 2 4 7
7 4 : 2 3 5 7
8 5 : 1 4 6 8
9 6 : 0 1 5
10 7 : 2 3 4
11 8 : 1 5
12
13

```

Output

1 | 3

Input 3

1 | 0
2 | 1
3 | 0 : 2 3 4 5 6 7 8 9 10 11 12
4 | 1 : 2 3 4 5 6 7 8 9 10 11 12
5 | 2 : 0 1
6 | 3 : 0 1
7 | 4 : 0 1
8 | 5 : 0 1
9 | 6 : 0 1
10 | 7 : 0 1
11 | 8 : 0 1
12 | 9 : 0 1
13 | 10 : 0 1
14 | 11 : 0 1
15 | 12 : 0 1
16 |
17 |

Output

1 | 11

Private Test case

Input 1

1 | 0
2 | 1
3 | 0 : 2 3 4 5 6 7 8 9 10 11 12
4 | 1 : 2 3 4 5 6 7 8 9 10 11 12
5 | 2 : 0 1
6 | 3 : 0 1
7 | 4 : 0 1
8 | 5 : 0 1
9 | 6 : 0 1
10 | 7 : 0 1
11 | 8 : 0 1
12 | 9 : 0 1
13 | 10 : 0 1
14 | 11 : 0 1
15 | 12 : 0 1
16 |
17 |

Output

1 | 11

Input 2

```
1 | 0
2 | 1
3 | 0 : 2
4 | 1 : 12
5 | 2 : 0 3
6 | 3 : 2 4
7 | 4 : 3 5
8 | 5 : 4 6
9 | 6 : 5 7
10 | 7 : 6 8
11 | 8 : 7 9
12 | 9 : 8 10
13 | 10 : 9 11
14 | 11 : 10 12
15 | 12 : 1 11
16 |
17 |
```

Output

1 | 1

Input 3

```
1 | 0
2 | 1
3 | 0 : 2 3
4 | 1 : 11 12
5 | 2 : 0 3 12
6 | 3 : 0 2 4
7 | 4 : 3 5
8 | 5 : 4 6
9 | 6 : 5 7
10 | 7 : 6 8
11 | 8 : 7 9
12 | 9 : 8 10
13 | 10 : 9 11
14 | 11 : 1 10 12
15 | 12 : 1 2 11
16 |
17 |
```

Output

1 | 2

Week 4 - Live Coding Problem 3

Cool Worker

A group of workers have to complete a list of tasks, those tasks have dependencies within the task list. But the workers prefer some interesting task and hates to do some boring task. They always do the most interesting one among the available tasks to be done.

Write a function `coolworkers(AList, preference)` to return the order in which the tasks will be done. `AList` is the adjacency list with the dependencies and `preference` is the tasks sorted in preferred order, in which task in index `0` is the most preferred and index `-1` (last element) be the least preferred.

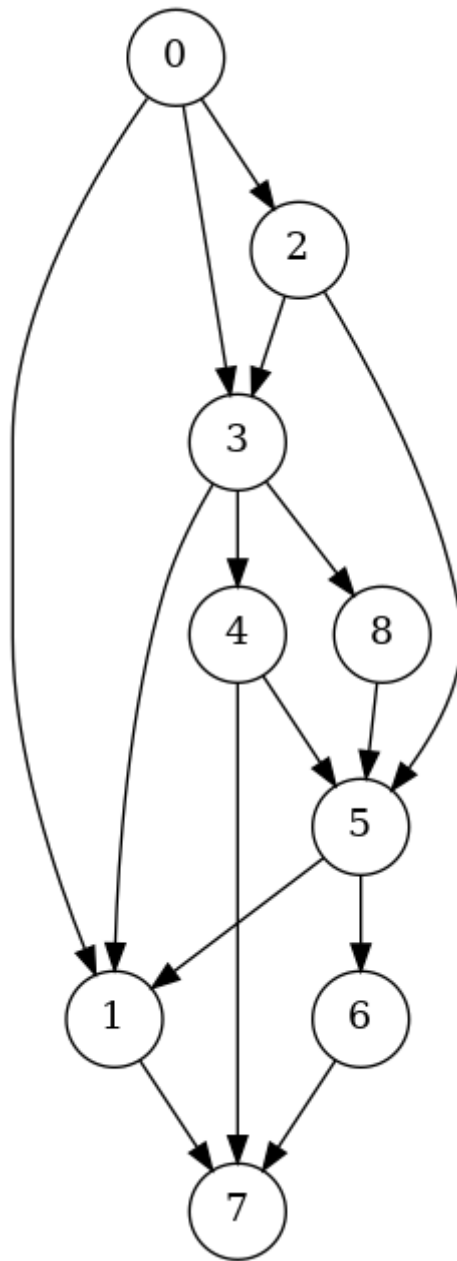
Sample Input

```
1  AList = {0: [1, 2, 3],
2           1: [7],
3           2: [3, 5],
4           3: [4, 1, 8],
5           7: [],
6           5: [6, 1],
7           4: [5, 7],
8           8: [5],
9           6: [7]}
10 preference = [1, 3, 2, 6, 8, 5, 4, 0, 7]
```

Sample Output

```
1  [0, 2, 3, 8, 4, 5, 1, 6, 7]
```

Graphical representation



Solution Code

```

1  def coolWorkers(AList, preference):
2      n = len(AList.keys())
3      indegree = {}
4      toposortlist = []
5      for i in AList.keys():
6          indegree[i] = 0
7      for u in AList.keys():
8          for v in AList[u]:
9              indegree[v] = indegree[v] + 1
10
11     for i in range(n):
12         availableTasks = [k for k in AList if indegree[k] == 0]
13         t = [(preference.index(i), i) for i in availableTasks]
14         t.sort()
15         j = t[0][1]
16         toposortlist.append(j)
17         indegree[j] = indegree[j] - 1
18         for k in AList[j]:

```

```
19 |         indegree[k] -= 1
20 |     return toposortlist
```

Suffix Code(Visible)

```
1 | AList = eval(input())
2 | preference = eval(input())
3 | print(coolworkers(AList, preference))
```

Public Test case

Input 1

```
1 | {0: [1, 2, 3], 1: [7], 2: [3, 5], 3: [4, 1, 8], 7: [], 5: [6, 1], 4: [5, 7],
   | 8: [5], 6: [7]}
2 | [1, 3, 2, 6, 8, 5, 4, 0, 7]
```

Output

```
1 | [0, 2, 3, 8, 4, 5, 1, 6, 7]
```

Input 2

```
1 | {0: [1, 2, 3], 1: [7], 2: [3, 5], 3: [5, 1], 7: [], 5: [6, 1], 4: [5, 7], 6:
   | [7], 8: [5]}
2 | [0, 8, 7, 5, 6, 1, 3, 2, 4]
```

Output

```
1 | [0, 8, 2, 3, 4, 5, 6, 1, 7]
```

Private Test case

Input 1

```
1 | {0: [1, 2, 3], 1: [7], 2: [3, 5], 3: [5, 1], 7: [], 5: [6, 1], 4: [5, 7], 6:
   | [7], 8: [5]}
2 | [2, 4, 3, 1, 6, 0, 7, 5, 8]
```

Output

```
1 | [4, 0, 2, 3, 8, 5, 1, 6, 7]
```

Input 2

```
1 | {0: [8], 8: [], 1: [8], 2: [8], 3: [8], 4: [8], 5: [8], 6: [8], 7: [8]}  
2 | [5, 6, 4, 1, 0, 3, 7, 2, 8]
```

Output

```
1 | [5, 6, 4, 1, 0, 3, 7, 2, 8]
```


Week 5 Live Coding Solutions

Week 5 Live Coding Solutions

Week-5 Live coding problem 1

Solution

Public Test case

Private Test case

Week-5 Live coding problem 2

Solution

Public Test Case

Private Test Case

Week-5 Live coding problem 3

Solution

Public Test case

Private Test case

Week-5 Live coding problem 1

An Airline company wants to make airport to connect n cities labeled 0 to $n-1$ all across the country . Write a function **Airport(distance_map)** that accepts a weighted adjacency list **distance_map** in the following format:-

```
1 distance_map = {
2     source_index : [(destination_index,distance(km)),
3                     (destination_index,distance),...],
4     ..
5     source_index : [(destination_index,distance),
6                     (destination_index,distance),...]
7 }
```

The function returns the minimum distance of airport network to connect all n cities.

Sample input

```
1 7 #(number of vertices)
2 [(0,1,10),(0,2,50),(0,3,300),(5,6,45),(2,1,30),(6,4,37),(1,6,65),(2,5,76),
3  (1,3,40),(3,4,60),(2,4,20)] #(Edges)
```

Output

```
1 182
```

Solution

Solution Code

```
1 def kruskal(WList):
2     (edges,component,TE)=([],{},[])
3     for u in WList.keys():
4         edges.extend([(d,u,v) for (v,d) in WList[u]])
5         component[u] = u
6     edges.sort()
7     for (d,u,v) in edges:
8         if component[u] != component[v]:
9             TE.append((u,v))
10            c = component[u]
11            for w in WList.keys():
12                if component[w] == c:
13                    component[w] = component[v]
14    return(TE)
15
16 def Airport(distance_map):
17     R = kruskal(distance_map)
18     S = 0
19     for e in R:
20         for ed in distance_map[e[0]]:
21             if ed[0]==e[1]:
```

```
22 |         s += ed[1]
23 |     return s
```

Suffix code(visible)

```
1 | size = int(input())
2 | edges = eval(input())
3 | WL = {}
4 | for i in range(size):
5 |     WL[i] = []
6 | for ed in edges:
7 |     WL[ed[0]].append((ed[1],ed[2]))
8 |     WL[ed[1]].append((ed[0],ed[2]))
9 | print(Airport(WL))
```

Public Test case

Input 1

```
1 | 7
2 | [(0,1,10),(0,2,50),(0,3,300),(5,6,45),(2,1,30),(6,4,37),(1,6,65),(2,5,76),
   | (1,3,40),(3,4,60),(2,4,20)]
```

Output

```
1 | 182
```

Input 2

```
1 | 6
2 | [(0,1,16),(0,3,2),(1,2,4),(3,4,10),(0,4,9),(3,5,15),(1,5,7),(2,5,6)]
```

Output

```
1 | 36
```

Input 3

```
1 | 4
2 | [(0,1,2),(1,2,4),(0,3,3),(0,2,1),(2,3,6)]
```

Output

```
1 | 6
```

Private Test case

Input 1

| | |
|---|---|
| 1 | 6 |
| 2 | [(0,1,1),(0,2,6),(1,2,3),(1,3,4),(2,4,4),(2,3,2),(3,4,3),(1,5,2),(2,5,7),(3,5,1),(4,5,5)] |

Output

| | |
|---|---|
| 1 | 9 |
|---|---|

Input 2

| | |
|---|---|
| 1 | 7 |
| 2 | [(0,1,10),(1,2,50),(2,3,60),(3,0,75),(3,1,80),(6,4,90),(1,6,100),(2,5,110),(3,6,150),(3,4,180),(0,4,200)] |

Output

| | |
|---|-----|
| 1 | 420 |
|---|-----|

Input 3

| | |
|---|--|
| 1 | 6 |
| 2 | [(0,1,1),(1,2,3),(1,3,4),(1,4,5),(0,4,7),(0,5,10),(2,3,12),(3,4,13),(1,5,15),(2,5,17),(3,5,21),(4,5,25)] |

Output

| | |
|---|----|
| 1 | 23 |
|---|----|

Week-5 Live coding problem 2

You are given a network of `n` nodes, labelled from `0` to `n-1`. You are also given `travel_times`, a list of signal travel times in as directed edges `travel_times[i] = (ui, vi, wi)`, where `ui` is the source node, `vi` is the target node, and `wi` is the time it takes for a signal to travel from source to target.

Write a function `min_transmission_time(n, travel_times, s)` that accept number of nodes `n`, a list `travel_times` and a source node `s` to send the signal. The function returns the **minimum** time required for the signal sent by the source node `s` to be received by all the remaining `n-1` nodes. If it is impossible to obtain a signal for all `n-1` nodes, return `-1`.

Sample Input 1

```
1 4 #n
2 [(2,1,1),(2,3,1),(3,4,1)] #travel_times
3 2 #s
```

Output

```
1 2
```

Sample Input 2

```
1 4
2 [(2,1,1),(2,3,1),(4,3,1)]
3 2
```

Output

```
1 -1
```

Sample Input 3

```
1 7
2 [(0,1,10),(0,2,80),(1,2,6),(1,4,20),(2,3,70),(4,5,50),(4,6,5),(5,6,10)]
3 0
```

Output

```
1 86
```

Solution

Solution

```
1 def dijkstralist(WList,s):
2     infinity = 1 + len(WList.keys())*max([d for u in WList.keys() for (v,d)
3     in WList[u]])
4     (visited,distance) = ({},{})
5     for v in WList.keys():
6         (visited[v],distance[v]) = (False,infinity)
7
8     distance[s] = 0
9
10    for u in WList.keys():
11        nextd = min([distance[v] for v in WList.keys() if not visited[v]])
12        nextvlist = [v for v in WList.keys() if (not visited[v]) and
13        distance[v] == nextd]
14        nextv = min(nextvlist)
15        visited[nextv] = True
16        for (v,d) in WList[nextv]:
17            if not visited[v]:
18                distance[v] = min(distance[v],distance[nextv]+d)
19    return(distance,infinity)
20
21 def min_transmission_time(n, travel_times, s):
22     AList={}
23     for i in range(n):
24         AList[i]=[]
25     for u,v,d in travel_times:
26         AList[u].append((v,d))
27     dist,inf = dijkstralist(AList,s)
28     maxtime = 0
29     for node,distance in dist.items():
30         if distance >= maxtime:
31             maxtime = distance
32     if maxtime >= inf:
33         return -1
34     else:
35         return maxtime
```

Suffix Code

```
1 n = int(input())
2 edges = eval(input())
3 s = int(input())
4 print(min_transmission_time(n, edges, s))
```

Public Test Case

Input 1

```
1 4
2 [(1,0,1),(1,2,1),(2,3,1)]
3 1
```

Output

1 | 2

Input 2

1 | 4
2 | [(1,0,1),(1,2,1),(3,2,1)]
3 | 3

Output

1 | -1

Input 3

1 | 7
2 | [(0,1,10),(0,2,80),(1,2,6),(1,4,20),(2,3,70),(4,5,50),(4,6,5),(5,6,10)]
3 | 0

Output

1 | 86

Private Test Case

Input 1

1 | 5
2 | [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(3,4,600),(2,4,2000)]
3 | 0

Output

1 | 1900

Input 2

1 | 5
2 | [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(4,3,600),(4,2,2000)]
3 | 0

Output

1 | -1

Input 3

| | |
|---|--|
| 1 | 8 |
| 2 | [(0,1,1000),(0,7,800),(1,5,200),(2,1,100),(2,3,100),(3,4,300),(4,5,500), (5,2,200),(2,4,200),(6,1,400),(6,5,100),(7,6,100)] |
| 3 | 0 |

Output

| | |
|---|------|
| 1 | 1400 |
|---|------|

Input 4

| | |
|---|--|
| 1 | 8 |
| 2 | [(0,1,1000),(0,7,800),(1,5,200),(2,1,100),(2,3,100),(3,4,300),(4,5,500), (5,2,200),(2,4,200),(6,1,400),(6,5,100),(7,6,100)] |
| 3 | 6 |

Output

| | |
|---|----|
| 1 | -1 |
|---|----|

Input 4

| | |
|---|--|
| 1 | 8 |
| 2 | [(0,1,1000),(0,7,800),(1,5,200),(2,1,100),(2,0,100),(1,3,300),(3,4,300), (4,5,500),(5,2,200),(2,4,200),(6,1,400),(6,5,100),(7,6,100)] |
| 3 | 2 |

Output

| | |
|---|------|
| 1 | 1000 |
|---|------|

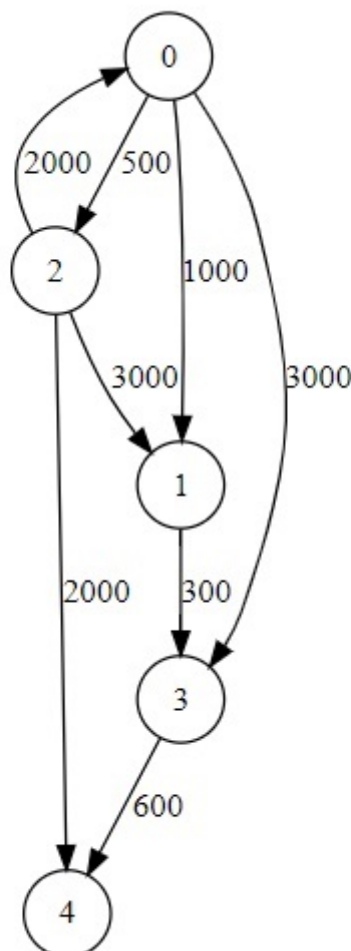
Week-5 Live coding problem 3

An airlines company has flights operational in n cities labeled 0 to $n-1$. Write a function **best_fare(flight_route, source, destination, k)** in which you are given a weighted adjacency list **flight_route** in the following format:-

```
1 flight_route = {
2     source_index : [(destination_index,price),(destination_index,price),..],
3     ..
4     ..
5     source_index : [(destination_index,price),(destination_index,price),..]
6 }
```

You are also given three integers **source**, **destination** and **k**(positive integer), function returns minimum cost and flight route in the format **(minimum_cost, [source, next_stop, next_stop, ..., destination])** from **source** to **destination** with at most **k** stops in between (source and destination are not included). If there is no such route, return string **Not found**.

For the given graph



Sample Input-1

```

1 5 # number of vertices
2 [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(3,4,600),
   (2,4,2000)] #edges
3 0 # source
4 4 # destination
5 1 # k (Maximum stops allowed in route)

```

Output

```

1 (2500, [0, 2, 4])

```

Sample Input-2

```

1 5
2 [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(3,4,600),
   (2,4,2000)]
3 0
4 4
5 0

```

Output

```

1 Not found

```

Solution

Prefix code(visible)

```

1 def addallpath(WList,u, d, visited, path,allpath):
2     visited[u]= True
3     path.append(u)
4     if u == d:
5         L = path.copy()
6         allpath.append(L)
7     else:
8         for i in WList[u]:
9             if visited[i[0]]== False:
10                addallpath(WList, i[0], d, visited, path, allpath)
11    path.pop()
12    visited[u]= False
13    # Following function returns a list of all paths from s to d
14    # Format of returned list:- [[s,...,d],[s,...,d],...]
15    def findallpath(WList,s,d):
16        visited = {}
17        allpath = []
18        for v in WList.keys():
19            visited[v] = False
20        path = []
21        addallpath(WList,s, d, visited, path,allpath)
22        return(allpath)

```

Solution Code

```
1 def best_fare(flight_route,source,destination,k):
2     L = findallpath(flight_route,source,destination)
3     if L != []:
4         cost = 1 + len(flight_route.keys())*max([d for u in
5 flight_route.keys() for (v,d) in flight_route[u]])
6         route = []
7         for pth in L:
8             if len(pth) < k+3:
9                 s = 0
10                for i in range(0,len(pth)-1):
11                    for j in flight_route[pth[i]]:
12                        if pth[i+1] == j[0]:
13                            s += j[1]
14                if s < cost:
15                    cost = s
16                    route = pth
17            if route != []:
18                return (cost,route)
19            else:
20                return 'Not found'
21    else:
22        return 'Not found'
```

Prefix code(visible)

```
1 size = int(input())
2 edges = eval(input())
3 s = int(input())
4 d = int(input())
5 k = int(input())
6 WL = {}
7 for i in range(size):
8     WL[i] = []
9 for ed in edges:
10     WL[ed[0]].append((ed[1],ed[2]))
11 print(best_fare(WL,s,d,k))
```

Public Test case

Input 1

```
1 5
2 [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(3,4,600),
3 (2,4,2000)]
4 0
5 4
6 1
```

Output

```
1 (2500, [0, 2, 4])
```

Input 2

| | |
|---|--|
| 1 | 5 |
| 2 | [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(3,4,600),(2,4,2000)] |
| 3 | 0 |
| 4 | 4 |
| 5 | 0 |

Output

| | |
|---|-----------|
| 1 | Not found |
|---|-----------|

Private Test case

Input 1

| | |
|---|--|
| 1 | 5 |
| 2 | [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(3,4,600),(2,4,2000)] |
| 3 | 2 |
| 4 | 4 |
| 5 | 2 |

Output

| | |
|---|----------------|
| 1 | (2000, [2, 4]) |
|---|----------------|

Input 2

| | |
|---|--|
| 1 | 5 |
| 2 | [(0,1,1000),(0,2,500),(0,3,3000),(2,0,2000),(2,1,3000),(1,3,300),(3,4,600),(2,4,2000)] |
| 3 | 0 |
| 4 | 4 |
| 5 | 2 |

Output

| | |
|---|----------------------|
| 1 | (1900, [0, 1, 3, 4]) |
|---|----------------------|

Week 6 Live Coding Solutions

Week 6 Live Coding Solutions

Week-6 Live coding problem 1

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Week-6 Live coding problem 2

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Week-6 Live coding problem 3

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Week-6 Live coding problem 1

Write a function `type_of_heap(A)` that accept a heap `A` and return string `Max` if input heap is max heap, `Min` if input heap is a min heap and `None` otherwise.

Sample input 1

```
1 | [1,2,3,4,5,6]
```

Output

```
1 | Min
```

Sample input 2

```
1 | [5,3,4,2,1]
```

Output

```
1 | Max
```

Sample input 3

```
1 | [1,5,4,7,6,3,2]
```

Output

```
1 | None
```

Solution

Solution Code

```
1 def minheap(A):
2     for i in range((len(A) - 2) // 2 + 1):
3         if A[i] > A[2*i + 1] or (2*i + 2 != len(A) and A[i] > A[2*i + 2]):
4             return False
5     return True
6 def maxheap(A):
7     for i in range((len(A) - 2) // 2 + 1):
8         if A[i] < A[2*i + 1] or (2*i + 2 != len(A) and A[i] < A[2*i + 2]):
9             return False
10    return True
11 def type_of_heap(A):
12     if minheap(A)==True:
13         return 'Min'
14     if maxheap(A)==True:
15         return 'Max'
16     return 'None'
```

Suffix Code(visible)

```
1 A=eval(input())
2 print(type_of_heap(A))
```

Public Test case

Input 1

```
1 [1,2,3,4,5,6,7,8,9]
```

Output

```
1 Min
```

Input 2

```
1 [5,3,4,2,1]
```

Output

```
1 Max
```

Input 3

```
1 [1,5,4,7,6,3,2]
```

Output

1 | None

Private Test case

Input 1

1 | [67,65,43,54,6,2,1,19,5]

Output

1 | Max

Input 2

1 | [1,2,3,4,8,5,6,7]

Output

1 | Min

Input 3

1 | [1,2,3,4,5,9,8,7,6,12,13]

Output

1 | Min

Week-6 Live coding problem 2

Write a function `findRedundantEdges(E,n)` that accept an edge list `E` in increasing order of the edge weight where all edge weights are distinct and the number of vertices `n` (labeled from 0 to `n-1`) in a connected undirected graph and the function returns a list of redundant edges in increasing order of weight, so by removing these edges, the graph should remain connected with the minimum total cost of edges(minimum cost spanning tree). Try to write solution code of complexity $O((E+V)\log V)$.

Note - Selected edges tuples in the output list should be similar to input list edges tuples.

Hint- Union-find data structure

Sample input 2

```
1 | 4
2 | [(0,1,10),(1,2,20),(2,3,30),(3,0,40),(1,3,50)]
```

Output

```
1 | [(3, 0, 40), (1, 3, 50)]
```

Solution

Solution Code

```
1 class MakeUnionFind:
2     def __init__(self):
3         self.components = {}
4         self.members = {}
5         self.size = {}
6     def make_union_find(self,vertices):
7         for vertex in range(vertices):
8             self.components[vertex] = vertex
9             self.members[vertex] = [vertex]
10            self.size[vertex] = 1
11    def find(self,vertex):
12        return self.components[vertex]
13    def union(self,u,v):
14        c_old = self.components[u]
15        c_new = self.components[v]
16        # Always add member in components which have greater size
17        if self.size[c_new] >= self.size[c_old]:
18            for x in self.members[c_old]:
19                self.components[x] = c_new
20                self.members[c_new].append(x)
21                self.size[c_new] += 1
22        else:
23            for x in self.members[c_new]:
24                self.components[x] = c_old
25                self.members[c_old].append(x)
```

```

26         self.size[c_old] += 1
27
28     def findRedundantEdges(E,n):
29         st = MakeUnionFind()
30         st.make_union_find(n)
31         redlist=[]
32         for edge in E:
33             if st.find(edge[0])!=st.find(edge[1]):
34                 st.union(edge[0], edge[1])
35             else:
36                 redlist.append(edge)
37         return redlist

```

Suffix code(visible)

```

1  n = int(input())
2  E=eval(input())
3  print(findRedundantEdges(E,n))

```

Public Test case

Input 1

```

1  7
2  [(0,1,10),(0,2,50),(0,3,60),(5,6,75),(2,1,80),(6,4,90),(1,6,100),(2,5,110),
    (1,3,150),(3,4,180),(2,4,200)]

```

Output

```

1  [(2, 1, 80), (2, 5, 110), (1, 3, 150), (3, 4, 180), (2, 4, 200)]

```

Input 2

```

1  4
2  [(0,1,10),(1,2,20),(2,3,30),(3,0,40),(1,3,50)]

```

Output

```

1  [(3, 0, 40), (1, 3, 50)]

```

Input 3

```

1  4
2  [(0,2,1),(0,1,2),(0,3,3),(1,2,4),(2,3,6)]

```

Output

```

1  [(1, 2, 4), (2, 3, 6)]

```

Private Test case

Input 1

| | |
|---|---|
| 1 | 6 |
| 2 | [(0,1,1),(1,2,3),(1,3,4),(0,2,5),(2,4,7),(2,3,12),(3,4,13),(1,5,15),(2,5,17),(3,5,21),(4,5,25)] |

Output

| | |
|---|---|
| 1 | [(0, 2, 5), (2, 3, 12), (3, 4, 13), (2, 5, 17), (3, 5, 21), (4, 5, 25)] |
|---|---|

Input 2

| | |
|---|--|
| 1 | 6 |
| 2 | [(0,1,1),(1,2,3),(1,3,4),(1,4,5),(0,4,7),(0,5,10),(2,3,12),(3,4,13),(1,5,15),(2,5,17),(3,5,21),(4,5,25)] |

Output

| | |
|---|---|
| 1 | [(0, 4, 7), (2, 3, 12), (3, 4, 13), (1, 5, 15), (2, 5, 17), (3, 5, 21), (4, 5, 25)] |
|---|---|

Input 3

| | |
|---|---|
| 1 | 7 |
| 2 | [(0,1,10),(1,2,50),(2,3,60),(3,0,75),(3,1,80),(6,4,90),(1,6,100),(2,5,110),(3,6,150),(3,4,180),(0,4,200)] |

Output

| | |
|---|---|
| 1 | [(3, 0, 75), (3, 1, 80), (3, 6, 150), (3, 4, 180), (0, 4, 200)] |
|---|---|

Week-6 Live coding problem 3

Write a function `find_kth_largest(root, k)` that accept `root` as a reference of root node of BST of `n` elements and an integer `k`, where $0 < k \leq n$. The function should return the `kth` largest element without doing any modification in Binary Search Tree. The complexity of the solution should be in order of $O(\log n + k)$

Structure of the Tree class

```
1 class Tree:
2     def __init__(self, initval=None):
3         self.value = initval
4         if self.value:
5             self.left = Tree()
6             self.right = Tree()
7         else:
8             self.left = None
9             self.right = None
10        return
```

Sample input

```
1 [5,4,6,3,2,1,7] #bst created using given sequence
2 3 #k
```

Output

```
1 5
```

Solution

Solution Code

```
1 def kthlargest(root):
2     global count, result
3     if root.right != None:
4         find_kth_largest(root.right, k)
5         count += 1
6         if count == k:
7             result = root.value
8             return
9         find_kth_largest(root.left, k)
10    count = 0
11    result = -1
12    def find_kth_largest(root, k):
13        kthlargest(root)
14    return result
```

Suffix code(hidden)

```
1 class Tree:
2     # Constructor:
3     def __init__(self,initval=None):
4         self.value = initval
5         if self.value:
6             self.left = Tree()
7             self.right = Tree()
8         else:
9             self.left = None
10            self.right = None
11        return
12    # Only empty node has value None
13    def isempty(self):
14        return (self.value == None)
15
16    def insert(self,v):
17        if self.isempty():
18            self.value = v
19            self.left = Tree()
20            self.right = Tree()
21        if self.value == v:
22            return
23        if v < self.value:
24            self.left.insert(v)
25            return
26        if v > self.value:
27            self.right.insert(v)
28            return
29
30    T = Tree()
31    bst = eval(input())
32    k = int(input())
33    for i in bst:
34        T.insert(i)
35    print(find_kth_largest(T,k))
```

Public Test case

Input 1

```
1 | [5,4,6,3,2,1,7]
2 | 3
```

Output

```
1 | 5
```

Input 2

| | |
|---|-------------------|
| 1 | [8,7,6,5,4,3,2,1] |
| 2 | 2 |

Output

| | |
|---|---|
| 1 | 7 |
|---|---|

Input 3

| | |
|---|--|
| 1 | [108, 348, 332, 463, 167, 148, 155, 331, 435, 349, 261, 336, 135, 449, 384, 183, 428, 262, 434, 276, 87, 29, 203, 24, 347, 119, 251, 370, 456, 433, 49, 421, 410, 57, 218, 226, 359, 163, 42, 179, 192, 10, 295, 235, 99, 286, 116, 290, 169, 146, 71, 34, 44, 141, 353, 132, 346, 488, 84, 16, 74, 289, 424, 59, 240, 252, 427, 250, 321, 281, 496, 288, 112, 408, 393, 247, 12, 387, 447, 278, 323, 338, 483, 379, 80, 114, 365, 118, 77, 164, 154, 325, 376, 180, 54, 140, 401, 223, 50, 14, 396, 25, 117, 38, 230, 144, 440, 206, 48, 388, 227, 268, 360, 300, 414, 274, 445, 200, 444, 106, 324, 490, 211, 477, 476, 238, 354, 204, 195, 258, 404, 26, 471, 263, 468, 176, 58, 110, 15, 19, 264, 378, 94, 439, 186, 193, 91, 419, 30, 102, 174, 7, 337, 136, 143, 88, 134, 291] |
| 2 | 5 |

Output

| | |
|---|-----|
| 1 | 477 |
|---|-----|

Private Test case

Input 1

| | |
|---|--------------------------|
| 1 | [15,4,7,8,5,3,9,13,16,1] |
| 2 | 1 |

Output

| | |
|---|----|
| 1 | 16 |
|---|----|

Input 2

| | |
|---|--------------------------|
| 1 | [15,4,7,8,5,3,9,13,16,1] |
| 2 | 10 |

Output

| | |
|---|---|
| 1 | 1 |
|---|---|

Input 3

```
1 [364, 266, 305, 157, 133, 391, 316, 68, 409, 432, 172, 39, 467, 92, 277, 82,
  425, 311, 107, 204, 120, 497, 320, 178, 359, 90, 206, 239, 153, 1, 91, 31,
  392, 106, 209, 262, 303, 122, 430, 195, 191, 156, 60, 344, 285, 67, 268, 496,
  225, 4, 96, 396, 358, 356, 429, 235, 108, 291, 275, 388, 341, 465, 118, 12,
  363, 161, 104, 486, 197, 20, 18, 472, 164, 199, 366, 26, 336, 227, 287, 244,
  132, 272, 258, 110, 299, 184, 142, 86, 243, 50, 185, 167, 294, 116, 11, 180,
  416, 176, 450, 10, 245, 492, 264, 121, 421, 454, 362, 162, 386, 6, 37, 426,
  408, 41, 134, 298, 30, 25, 74, 155, 301, 128, 489, 340, 329, 446, 3, 282, 13,
  233, 475, 64, 190, 315, 51, 373, 61, 474, 399, 213, 248, 208, 331, 179, 471,
  140, 249, 415, 77, 186, 317, 188, 57, 230, 293, 148, 457, 355, 260, 276, 177,
  322, 189, 418]
2 10
```

Output

```
1 467
```


Week 7 Live Coding Solutions

Week 7 Live Coding Solutions

Week-7 Live coding problem 1

Solution

Public Test case

Private Test case

Week-7 Live coding problem 2

Solution

Public Test Case

Private test case

Week-7 Live coding problem 3

Solution

Public Test case

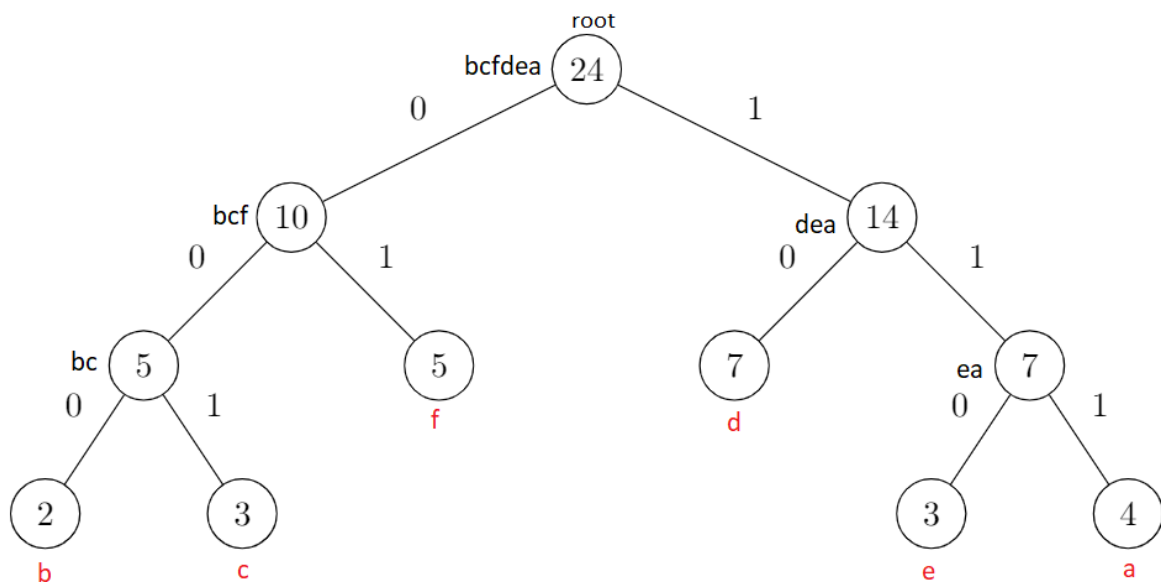
Private Test case

Week-7 Live coding problem 1

Write a function **decode(root, ciphertext)** that accepts a variable `root` which contains the reference of the root node of Huffman tree and an encoded message `ciphertext` in the form of a string (using 0 and 1). The function returns the decoded message in the form of a string.

Structure of node in given Huffman tree

```
1 class Node:
2     def __init__(self, frequency, symbol = None, left = None, right = None):
3         self.frequency = frequency
4         self.symbol = symbol
5         self.left = left
6         self.right = right
```



- Leaf node contains the final symbol (in red color)

Sample Input

```
1 | 0001110001110000011011001 #Encoded message
```

Output

```
1 | bababcbdef # Decoded message
```

Solution

Solution code

```

1  # Solution
2  def decode(root,ciphertext):
3      message = ''
4      temp = root
5      for i in ciphertext:
6          if i == '0':
7              temp = temp.left
8          if i == '1':
9              temp = temp.right
10         if temp.left == None and temp.right == None:
11             message += temp.symbol
12             temp = root
13     return message

```

Suffix Code(Hidden)

```

1  class Node:
2      def __init__(self,frequency,symbol=None,left=None,right=None):
3          self.frequency = frequency
4          self.symbol = symbol
5          self.left = left
6          self.right = right
7
8  def Huffman(s):
9      char = list(s)
10     freqlist=[]
11     unique = set(char)
12     for c in unique:
13         freqlist.append((char.count(c),c))
14     nodes = []
15     for nd in sorted(freqlist):
16         nodes.append((nd,Node(nd[0],nd[1])))
17     while len(nodes) > 1:
18         nodes.sort()
19         L = nodes[0][1]
20         R = nodes[1][1]
21         newnode = Node(L.frequency + R.frequency,L.symbol+R.symbol,L,R)
22         nodes.pop(0)
23         nodes.pop(0)
24         nodes.append(((L.frequency+R.frequency,L.symbol+R.symbol),newnode))
25     return newnode
26
27  # huffman code
28  '''a 111
29  b 000
30  c 001
31  d 10
32  e 110
33  f 01'''
34
35  s = 'aaaaccbbddddddeeefffff'
36  cipher = input()
37  res = Huffman(s)
38  print(decode(res,cipher))

```

Public Test case

Input 1

1 | 0001110001110000011011001

Output

1 | bababcdef

Input 2

1 | 11100000110110011110000011011001

Output

1 | abcdefabcdef

Input 3

1 | 01110100010001111110000011011001

Output

1 | fedcbaabcdef

Private Test case

Input 1

1 | 0111010001000111111000001101100111100000110110011110000011011001

Output

1 | fedcbaabcdefabcdefabcdef

Input 2

1 | 11111111111111111111111111111111

Output

```
1 | aaaaaaaaaa
```

Input 3

```
1 | 100110011001100110011001
```

Output

```
1 | dfdfdfdfdfd
```

Week-7 Live coding problem 2

Write a method `MaxValueSelection(items, C)` that accepts a dictionary `items` where each key of the dictionary represents the item name and the corresponding value is a tuple `(number of units, value of all units)` and function accept one more variable `C` which represents the maximum capacity of units you can select from all items to get maximum value.

Sample input

```
1 {1:(10,60),2:(20,100),3:(30,120)}
2 50
```

Output

```
1 240.0
```

Solution

Solution Code

```
1 def MaxValueSelection(items, C):
2     itemlist = []
3     for i,j in items.items():
4         itemlist.append((j[1]/j[0],i,j[0]))
5     itemlist.sort(reverse=True)
6     maxvalue = 0
7     for itm in itemlist:
8         if C > itm[2]:
9             maxvalue += itm[0]*itm[2]
10            C = C - itm[2]
11        else:
12            maxvalue += C*itm[0]
13            C = 0
14            break
15    return maxvalue
```

Suffix code(Visible)

```
1 items = eval(input())
2 C = int(input())
3 print(round(MaxValueSelection(items, C),2))
```

Public Test Case

Input 1

```
1 {1:(10,60),2:(20,100),3:(30,120)}
2 50
```

Output

```
1 240.0
```

Input 2

```
1 {1:(6,110),2:(7,120),3:(3,2)}
2 10
```

Output

```
1 178.57
```

Input 3

```
1 {1:(4,400),2:(9,1800),3:(10,3500),4:(5,4000),5:(2,1000),6:(1,200)}
2 15
```

Output

```
1 7800.0
```

Input 4

```
1 {1:(4,400),2:(9,1800),3:(10,3500),4:(20,4000),5:(2,1000),6:(1,200)}
2 20
```

Output

```
1 6100.0
```

Input 5

```
1 {1:(4,1600),2:(9,2700),3:(10,3500),4:(5,4000),5:(2,1000),6:(2,1200),7:
  (2,1350),8:(9,1800),9:(10,2300),10:(5,1530),11:(2,100),12:(1,120),13:
  (2,1600),14:(3,2700),15:(7,3500),16:(8,4000),17:(1,1000),18:(6,1200),19:
  (1,1350),20:(10,1800),21:(2,2300),22:(10,1530),23:(4,100),24:(1,125)}
2 1
```

Output

```
1 1350.0
```

Private test case

Input 1

```
1 | {1:(4,400),2:(9,1800),3:(10,3500),4:(5,4000),5:(2,1000),6:(1,200)}
2 | 8
```

Output

```
1 | 5350.0
```

Input 2

```
1 | {1:(4,1600),2:(9,2700),3:(10,3500),4:(5,4000),5:(2,1000),6:(2,1200),7:
   | (2,1350),8:(9,1800),9:(10,2300),10:(5,1530),11:(2,100),12:(1,120)}
2 | 25
```

Output

```
1 | 12650.0
```

Input 3

```
1 | {1:(4,1600),2:(9,2700),3:(10,3500),4:(5,4000),5:(2,1000),6:(2,1200),7:
   | (2,1350),8:(9,1800),9:(10,2300),10:(5,1530),11:(2,100),12:(1,120)}
2 | 10
```

Output

```
1 | 7050.0
```

Input 4

```
1 | {1:(4,1600),2:(9,2700),3:(10,3500),4:(5,4000),5:(2,1000),6:(2,1200),7:
   | (2,1350),8:(9,1800),9:(10,2300),10:(5,1530),11:(2,100),12:(1,120),13:
   | (2,1600),14:(3,2700),15:(7,3500),16:(8,4000),17:(1,1000),18:(6,1200),19:
   | (1,1350),20:(10,1800),21:(2,2300),22:(10,1530),23:(4,100),24:(1,125)}
2 | 30
```

Output

```
1 | 21500.0
```

Input 5


```
1 {1:(4,1600),2:(9,2700),3:(10,3500),4:(5,4000),5:(2,1000),6:(2,1200),7:  
  (2,1350),8:(9,1800),9:(10,2300),10:(5,1530),11:(2,100),12:(1,120),13:  
  (2,1600),14:(3,2700),15:(7,3500),16:(8,4000),17:(1,1000),18:(6,1200),19:  
  (1,1350),20:(10,1800),21:(2,2300),22:(10,1530),23:(4,100),24:(1,125)}  
2 2
```

Output

```
1 2500.0
```

Week-7 Live coding problem 3

Write a function `IsValid(hfcode, message)` that accept a dictionary `hfcode` in which key represents the character and corresponding value represents the Huffman code for that character and function accept one more string `message` (encoded message generated using Huffman codes). The function returns `True` if `message` is valid, otherwise return `False`.

Sample Input

```
1 {'a':'000', 'b':'0010', 'c':'0011', 'd':'01', 'e':'10', 'f':'11'} #huffman
  code
2 10101011010100000010011 #Encoded message
```

Output

```
1 False
```

Sample Input

```
1 {'a':'000', 'b':'0010', 'c':'0011', 'd':'01', 'e':'10', 'f':'11'}
2 111010111001011100011
```

Output

```
1 True
```

Solution

```
1 def IsValid(hfcode,message):
2     emsg = ''
3     huffcode={}
4     maxlength=0
5     for i,j in hfcode.items():
6         huffcode[j]=i
7         if len(j) > maxlength:
8             maxlength=len(j)
9     cd = ''
10    for b in message:
11        cd += b
12        if len(cd) > maxlength:
13            return False
14        if cd in huffcode:
15            emsg += huffcode[cd]
16            cd = ''
17    if cd == '':
18        return True
19    else:
20        return False
```

Suffix Code(visible)

```
1 hfcode = eval(input())
2 message = input()
3 print(IsCodeValid(hfcode,message))
```

Public Test case

Input 1

```
1 {'a':'000', 'b':'0010', 'c':'0011', 'd':'01', 'e':'10', 'f':'11'}
2 10101011010100000010011
```

Output

```
1 False
```

Input 2

```
1 {'a':'000', 'b':'0010', 'c':'0011', 'd':'01', 'e':'10', 'f':'11'}
2 111010111001011100011
```

Output

```
1 True
```

Input 3

```
1 {'a':'111', 'b':'000', 'c':'001', 'd':'10', 'e':'110', 'f':'01'}
2 11100000110110010111010001000111
```

Output

```
1 True
```

Private Test case

Input 1

```
1 {'a':'111', 'b':'000', 'c':'001', 'd':'10', 'e':'110', 'f':'01'}
2 111000001101100101110100010001111
```

Output

```
1 False
```

Input 2

```
1 | {'a':'111', 'b':'000', 'c':'001', 'd':'10', 'e':'110', 'f':'01'}  
2 | 11011101111111010101011110110
```

Output

```
1 | True
```

Input 3

```
1 | {'a':'111', 'b':'000', 'c':'001', 'd':'10', 'e':'110', 'f':'01'}  
2 | 111011
```

Output

```
1 | False
```

Week 8 Live Coding Solutions

Week 8 Live Coding Solutions

Problem 1

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Problem 2

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Problem 3

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Problem 1

Write a function `findMedian(A,B)` that accept two sorted list A and B of the same size and function return median of the sorted merged list of A and B. write a solution of order $O(\log n)$.

- If length of sorted merged list is odd then median is middle element.
- If length of sorted merged list is even then median is average of two middle elements.

Sample Input

```
1 | [1,3,5,7]
2 | [2,4,5,8]
```

Output

```
1 | 4.5
```

Sample Input

```
1 | [1,2,3,4,5,6]
2 | [7,8,9,10,12,13]
```

Output

```
1 | 6.5
```

Solution

Solution Code

```
1 def median(A,B,sA,lA,sB,lB):
2     n = lA - sA + 1
3     mid = n // 2
4     midA = sA + mid
5     if n % 2 == 0:
6         midB = sB + mid - 1
7     else:
8         midB = sB + mid
9     if n == 1:
10        return (A[sA] + B[sB]) / 2
11    elif n == 2:
12        return (max(A[sA], B[sB]) + min(A[lA], B[lB])) / 2
13    elif A[midA] == B[midB]:
14        return (A[midA] + B[midB]) / 2
15    elif A[midA] > B[midB]:
16        return median(A, B, sA, midA, midB, lB)
17    elif A[midA] < B[midB]:
18        return median(A, B, midA, lA, sB, midB)
19
20 def findMedian(A,B):
21     return median(A,B,0,len(A)-1,0,len(B)-1)
```

Suffix code(Visible)

```
1 def medianideal(A,B,sA,lA,sB,lB):
2     n = lA - sA + 1
3     mid = n // 2
4     midA = sA + mid
5     if n % 2 == 0:
6         midB = sB + mid - 1
7     else:
8         midB = sB + mid
9     if n == 1:
10        return (A[sA] + B[sB]) / 2
11    elif n == 2:
12        return (max(A[sA], B[sB]) + min(A[lA], B[lB])) / 2
13    elif A[midA] == B[midB]:
14        return (A[midA] + B[midB]) / 2
15    elif A[midA] > B[midB]:
16        return medianideal(A, B, sA, midA, midB, lB)
17    elif A[midA] < B[midB]:
18        return medianideal(A, B, midA, lA, sB, midB)
19
20 def findMedianideal(A,B):
21     return medianideal(A,B,0,len(A)-1,0,len(B)-1)
22
23
24 A = eval(input())
25 B = eval(input())
26
```

```

27 import time
28 t1 = time.perf_counter()
29 res = findMedian(A,B)
30 elapsedStudent = time.perf_counter() - t1
31
32 t1 = time.perf_counter()
33 res1 = findMedianideal(A,B)
34 elapsedIdeal = time.perf_counter() - t1
35
36 timeout = elapsedIdeal
37 if (elapsedStudent > timeout*3):
38     print("Timed Out. Write efficient code. Elapsed: " +
39         str(elapsedStudent))
40 else:
41     print(res)

```

Public Test case

Input 1

```

1 | [1,3,5,7]
2 | [2,4,5,8]

```

Output

```

1 | 4.5

```

Input 2

```

1 | [1,2,3,4,5,6]
2 | [7,8,9,10,12,13]

```

Output

```

1 | 6.5

```

Input 3

1 [0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580,

1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606,
1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632,
1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658,
1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684,
1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710,
1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736,
1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762,
1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788,
1790, 1792, 1794, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1812, 1814,
1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840,
1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866,
1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892,
1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918,
1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944,
1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970,
1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996,
1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022,
2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048,
2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 2074,
2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100,
2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126,
2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152,
2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178,
2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204,
2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230,
2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256,
2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282,
2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308,
2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334,
2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360,
2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386,
2388, 2390, 2392, 2394, 2396, 2398, 2400, 2402, 2404, 2406, 2408, 2410, 2412,
2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438,
2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464,
2466, 2468, 2470, 2472, 2474, 2476, 2478, 2480, 2482, 2484, 2486, 2488, 2490,
2492, 2494, 2496, 2498, 2500, 2502, 2504, 2506, 2508, 2510, 2512, 2514, 2516,
2518, 2520, 2522, 2524, 2526, 2528, 2530, 2532, 2534, 2536, 2538, 2540, 2542,
2544, 2546, 2548, 2550, 2552, 2554, 2556, 2558, 2560, 2562, 2564, 2566, 2568,
2570, 2572, 2574, 2576, 2578, 2580, 2582, 2584, 2586, 2588, 2590, 2592, 2594,
2596, 2598, 2600, 2602, 2604, 2606, 2608, 2610, 2612, 2614, 2616, 2618, 2620,
2622, 2624, 2626, 2628, 2630, 2632, 2634, 2636, 2638, 2640, 2642, 2644, 2646,
2648, 2650, 2652, 2654, 2656, 2658, 2660, 2662, 2664, 2666, 2668, 2670, 2672,
2674, 2676, 2678, 2680, 2682, 2684, 2686, 2688, 2690, 2692, 2694, 2696, 2698,
2700, 2702, 2704, 2706, 2708, 2710, 2712, 2714, 2716, 2718, 2720, 2722, 2724,
2726, 2728, 2730, 2732, 2734, 2736, 2738, 2740, 2742, 2744, 2746, 2748, 2750,
2752, 2754, 2756, 2758, 2760, 2762, 2764, 2766, 2768, 2770, 2772, 2774, 2776,
2778, 2780, 2782, 2784, 2786, 2788, 2790, 2792, 2794, 2796, 2798, 2800, 2802,
2804, 2806, 2808, 2810, 2812, 2814, 2816, 2818, 2820, 2822, 2824, 2826, 2828,
2830, 2832, 2834, 2836, 2838, 2840, 2842, 2844, 2846, 2848, 2850, 2852, 2854,
2856, 2858, 2860, 2862, 2864, 2866, 2868, 2870, 2872, 2874, 2876, 2878, 2880,
2882, 2884, 2886, 2888, 2890, 2892, 2894, 2896, 2898, 2900, 2902, 2904, 2906,
2908, 2910, 2912, 2914, 2916, 2918, 2920, 2922, 2924, 2926, 2928, 2930, 2932,
2934, 2936, 2938, 2940, 2942, 2944, 2946, 2948, 2950, 2952, 2954, 2956, 2958,
2960, 2962, 2964, 2966, 2968, 2970, 2972, 2974, 2976, 2978, 2980, 2982, 2984,
2986, 2988, 2990, 2992, 2994, 2996, 2998, 3000, 3002, 3004, 3006, 3008, 3010,

3012, 3014, 3016, 3018, 3020, 3022, 3024, 3026, 3028, 3030, 3032, 3034, 3036,
3038, 3040, 3042, 3044, 3046, 3048, 3050, 3052, 3054, 3056, 3058, 3060, 3062,
3064, 3066, 3068, 3070, 3072, 3074, 3076, 3078, 3080, 3082, 3084, 3086, 3088,
3090, 3092, 3094, 3096, 3098, 3100, 3102, 3104, 3106, 3108, 3110, 3112, 3114,
3116, 3118, 3120, 3122, 3124, 3126, 3128, 3130, 3132, 3134, 3136, 3138, 3140,
3142, 3144, 3146, 3148, 3150, 3152, 3154, 3156, 3158, 3160, 3162, 3164, 3166,
3168, 3170, 3172, 3174, 3176, 3178, 3180, 3182, 3184, 3186, 3188, 3190, 3192,
3194, 3196, 3198, 3200, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218,
3220, 3222, 3224, 3226, 3228, 3230, 3232, 3234, 3236, 3238, 3240, 3242, 3244,
3246, 3248, 3250, 3252, 3254, 3256, 3258, 3260, 3262, 3264, 3266, 3268, 3270,
3272, 3274, 3276, 3278, 3280, 3282, 3284, 3286, 3288, 3290, 3292, 3294, 3296,
3298, 3300, 3302, 3304, 3306, 3308, 3310, 3312, 3314, 3316, 3318, 3320, 3322,
3324, 3326, 3328, 3330, 3332, 3334, 3336, 3338, 3340, 3342, 3344, 3346, 3348,
3350, 3352, 3354, 3356, 3358, 3360, 3362, 3364, 3366, 3368, 3370, 3372, 3374,
3376, 3378, 3380, 3382, 3384, 3386, 3388, 3390, 3392, 3394, 3396, 3398, 3400,
3402, 3404, 3406, 3408, 3410, 3412, 3414, 3416, 3418, 3420, 3422, 3424, 3426,
3428, 3430, 3432, 3434, 3436, 3438, 3440, 3442, 3444, 3446, 3448, 3450, 3452,
3454, 3456, 3458, 3460, 3462, 3464, 3466, 3468, 3470, 3472, 3474, 3476, 3478,
3480, 3482, 3484, 3486, 3488, 3490, 3492, 3494, 3496, 3498, 3500, 3502, 3504,
3506, 3508, 3510, 3512, 3514, 3516, 3518, 3520, 3522, 3524, 3526, 3528, 3530,
3532, 3534, 3536, 3538, 3540, 3542, 3544, 3546, 3548, 3550, 3552, 3554, 3556,
3558, 3560, 3562, 3564, 3566, 3568, 3570, 3572, 3574, 3576, 3578, 3580, 3582,
3584, 3586, 3588, 3590, 3592, 3594, 3596, 3598, 3600, 3602, 3604, 3606, 3608,
3610, 3612, 3614, 3616, 3618, 3620, 3622, 3624, 3626, 3628, 3630, 3632, 3634,
3636, 3638, 3640, 3642, 3644, 3646, 3648, 3650, 3652, 3654, 3656, 3658, 3660,
3662, 3664, 3666, 3668, 3670, 3672, 3674, 3676, 3678, 3680, 3682, 3684, 3686,
3688, 3690, 3692, 3694, 3696, 3698, 3700, 3702, 3704, 3706, 3708, 3710, 3712,
3714, 3716, 3718, 3720, 3722, 3724, 3726, 3728, 3730, 3732, 3734, 3736, 3738,
3740, 3742, 3744, 3746, 3748, 3750, 3752, 3754, 3756, 3758, 3760, 3762, 3764,
3766, 3768, 3770, 3772, 3774, 3776, 3778, 3780, 3782, 3784, 3786, 3788, 3790,
3792, 3794, 3796, 3798, 3800, 3802, 3804, 3806, 3808, 3810, 3812, 3814, 3816,
3818, 3820, 3822, 3824, 3826, 3828, 3830, 3832, 3834, 3836, 3838, 3840, 3842,
3844, 3846, 3848, 3850, 3852, 3854, 3856, 3858, 3860, 3862, 3864, 3866, 3868,
3870, 3872, 3874, 3876, 3878, 3880, 3882, 3884, 3886, 3888, 3890, 3892, 3894,
3896, 3898, 3900, 3902, 3904, 3906, 3908, 3910, 3912, 3914, 3916, 3918, 3920,
3922, 3924, 3926, 3928, 3930, 3932, 3934, 3936, 3938, 3940, 3942, 3944, 3946,
3948, 3950, 3952, 3954, 3956, 3958, 3960, 3962, 3964, 3966, 3968, 3970, 3972,
3974, 3976, 3978, 3980, 3982, 3984, 3986, 3988, 3990, 3992, 3994, 3996, 3998,
4000, 4002, 4004, 4006, 4008, 4010, 4012, 4014, 4016, 4018, 4020, 4022, 4024,
4026, 4028, 4030, 4032, 4034, 4036, 4038, 4040, 4042, 4044, 4046, 4048, 4050,
4052, 4054, 4056, 4058, 4060, 4062, 4064, 4066, 4068, 4070, 4072, 4074, 4076,
4078, 4080, 4082, 4084, 4086, 4088, 4090, 4092, 4094, 4096, 4098, 4100, 4102,
4104, 4106, 4108, 4110, 4112, 4114, 4116, 4118, 4120, 4122, 4124, 4126, 4128,
4130, 4132, 4134, 4136, 4138, 4140, 4142, 4144, 4146, 4148, 4150, 4152, 4154,
4156, 4158, 4160, 4162, 4164, 4166, 4168, 4170, 4172, 4174, 4176, 4178, 4180,
4182, 4184, 4186, 4188, 4190, 4192, 4194, 4196, 4198, 4200, 4202, 4204, 4206,
4208, 4210, 4212, 4214, 4216, 4218, 4220, 4222, 4224, 4226, 4228, 4230, 4232,
4234, 4236, 4238, 4240, 4242, 4244, 4246, 4248, 4250, 4252, 4254, 4256, 4258,
4260, 4262, 4264, 4266, 4268, 4270, 4272, 4274, 4276, 4278, 4280, 4282, 4284,
4286, 4288, 4290, 4292, 4294, 4296, 4298, 4300, 4302, 4304, 4306, 4308, 4310,
4312, 4314, 4316, 4318, 4320, 4322, 4324, 4326, 4328, 4330, 4332, 4334, 4336,
4338, 4340, 4342, 4344, 4346, 4348, 4350, 4352, 4354, 4356, 4358, 4360, 4362,
4364, 4366, 4368, 4370, 4372, 4374, 4376, 4378, 4380, 4382, 4384, 4386, 4388,
4390, 4392, 4394, 4396, 4398, 4400, 4402, 4404, 4406, 4408, 4410, 4412, 4414,
4416, 4418, 4420, 4422, 4424, 4426, 4428, 4430, 4432, 4434, 4436, 4438, 4440,

4442, 4444, 4446, 4448, 4450, 4452, 4454, 4456, 4458, 4460, 4462, 4464, 4466,
4468, 4470, 4472, 4474, 4476, 4478, 4480, 4482, 4484, 4486, 4488, 4490, 4492,
4494, 4496, 4498, 4500, 4502, 4504, 4506, 4508, 4510, 4512, 4514, 4516, 4518,
4520, 4522, 4524, 4526, 4528, 4530, 4532, 4534, 4536, 4538, 4540, 4542, 4544,
4546, 4548, 4550, 4552, 4554, 4556, 4558, 4560, 4562, 4564, 4566, 4568, 4570,
4572, 4574, 4576, 4578, 4580, 4582, 4584, 4586, 4588, 4590, 4592, 4594, 4596,
4598, 4600, 4602, 4604, 4606, 4608, 4610, 4612, 4614, 4616, 4618, 4620, 4622,
4624, 4626, 4628, 4630, 4632, 4634, 4636, 4638, 4640, 4642, 4644, 4646, 4648,
4650, 4652, 4654, 4656, 4658, 4660, 4662, 4664, 4666, 4668, 4670, 4672, 4674,
4676, 4678, 4680, 4682, 4684, 4686, 4688, 4690, 4692, 4694, 4696, 4698, 4700,
4702, 4704, 4706, 4708, 4710, 4712, 4714, 4716, 4718, 4720, 4722, 4724, 4726,
4728, 4730, 4732, 4734, 4736, 4738, 4740, 4742, 4744, 4746, 4748, 4750, 4752,
4754, 4756, 4758, 4760, 4762, 4764, 4766, 4768, 4770, 4772, 4774, 4776, 4778,
4780, 4782, 4784, 4786, 4788, 4790, 4792, 4794, 4796, 4798, 4800, 4802, 4804,
4806, 4808, 4810, 4812, 4814, 4816, 4818, 4820, 4822, 4824, 4826, 4828, 4830,
4832, 4834, 4836, 4838, 4840, 4842, 4844, 4846, 4848, 4850, 4852, 4854, 4856,
4858, 4860, 4862, 4864, 4866, 4868, 4870, 4872, 4874, 4876, 4878, 4880, 4882,
4884, 4886, 4888, 4890, 4892, 4894, 4896, 4898, 4900, 4902, 4904, 4906, 4908,
4910, 4912, 4914, 4916, 4918, 4920, 4922, 4924, 4926, 4928, 4930, 4932, 4934,
4936, 4938, 4940, 4942, 4944, 4946, 4948, 4950, 4952, 4954, 4956, 4958, 4960,
4962, 4964, 4966, 4968, 4970, 4972, 4974, 4976, 4978, 4980, 4982, 4984, 4986,
4988, 4990, 4992, 4994, 4996, 4998, 5000, 5002, 5004, 5006, 5008, 5010, 5012,
5014, 5016, 5018, 5020, 5022, 5024, 5026, 5028, 5030, 5032, 5034, 5036, 5038,
5040, 5042, 5044, 5046, 5048, 5050, 5052, 5054, 5056, 5058, 5060, 5062, 5064,
5066, 5068, 5070, 5072, 5074, 5076, 5078, 5080, 5082, 5084, 5086, 5088, 5090,
5092, 5094, 5096, 5098, 5100, 5102, 5104, 5106, 5108, 5110, 5112, 5114, 5116,
5118, 5120, 5122, 5124, 5126, 5128, 5130, 5132, 5134, 5136, 5138, 5140, 5142,
5144, 5146, 5148, 5150, 5152, 5154, 5156, 5158, 5160, 5162, 5164, 5166, 5168,
5170, 5172, 5174, 5176, 5178, 5180, 5182, 5184, 5186, 5188, 5190, 5192, 5194,
5196, 5198, 5200, 5202, 5204, 5206, 5208, 5210, 5212, 5214, 5216, 5218, 5220,
5222, 5224, 5226, 5228, 5230, 5232, 5234, 5236, 5238, 5240, 5242, 5244, 5246,
5248, 5250, 5252, 5254, 5256, 5258, 5260, 5262, 5264, 5266, 5268, 5270, 5272,
5274, 5276, 5278, 5280, 5282, 5284, 5286, 5288, 5290, 5292, 5294, 5296, 5298,
5300, 5302, 5304, 5306, 5308, 5310, 5312, 5314, 5316, 5318, 5320, 5322, 5324,
5326, 5328, 5330, 5332, 5334, 5336, 5338, 5340, 5342, 5344, 5346, 5348, 5350,
5352, 5354, 5356, 5358, 5360, 5362, 5364, 5366, 5368, 5370, 5372, 5374, 5376,
5378, 5380, 5382, 5384, 5386, 5388, 5390, 5392, 5394, 5396, 5398, 5400, 5402,
5404, 5406, 5408, 5410, 5412, 5414, 5416, 5418, 5420, 5422, 5424, 5426, 5428,
5430, 5432, 5434, 5436, 5438, 5440, 5442, 5444, 5446, 5448, 5450, 5452, 5454,
5456, 5458, 5460, 5462, 5464, 5466, 5468, 5470, 5472, 5474, 5476, 5478, 5480,
5482, 5484, 5486, 5488, 5490, 5492, 5494, 5496, 5498, 5500, 5502, 5504, 5506,
5508, 5510, 5512, 5514, 5516, 5518, 5520, 5522, 5524, 5526, 5528, 5530, 5532,
5534, 5536, 5538, 5540, 5542, 5544, 5546, 5548, 5550, 5552, 5554, 5556, 5558,
5560, 5562, 5564, 5566, 5568, 5570, 5572, 5574, 5576, 5578, 5580, 5582, 5584,
5586, 5588, 5590, 5592, 5594, 5596, 5598, 5600, 5602, 5604, 5606, 5608, 5610,
5612, 5614, 5616, 5618, 5620, 5622, 5624, 5626, 5628, 5630, 5632, 5634, 5636,
5638, 5640, 5642, 5644, 5646, 5648, 5650, 5652, 5654, 5656, 5658, 5660, 5662,
5664, 5666, 5668, 5670, 5672, 5674, 5676, 5678, 5680, 5682, 5684, 5686, 5688,
5690, 5692, 5694, 5696, 5698, 5700, 5702, 5704, 5706, 5708, 5710, 5712, 5714,
5716, 5718, 5720, 5722, 5724, 5726, 5728, 5730, 5732, 5734, 5736, 5738, 5740,
5742, 5744, 5746, 5748, 5750, 5752, 5754, 5756, 5758, 5760, 5762, 5764, 5766,
5768, 5770, 5772, 5774, 5776, 5778, 5780, 5782, 5784, 5786, 5788, 5790, 5792,
5794, 5796, 5798, 5800, 5802, 5804, 5806, 5808, 5810, 5812, 5814, 5816, 5818,
5820, 5822, 5824, 5826, 5828, 5830, 5832, 5834, 5836, 5838, 5840, 5842, 5844,
5846, 5848, 5850, 5852, 5854, 5856, 5858, 5860, 5862, 5864, 5866, 5868, 5870,

5872, 5874, 5876, 5878, 5880, 5882, 5884, 5886, 5888, 5890, 5892, 5894, 5896,
5898, 5900, 5902, 5904, 5906, 5908, 5910, 5912, 5914, 5916, 5918, 5920, 5922,
5924, 5926, 5928, 5930, 5932, 5934, 5936, 5938, 5940, 5942, 5944, 5946, 5948,
5950, 5952, 5954, 5956, 5958, 5960, 5962, 5964, 5966, 5968, 5970, 5972, 5974,
5976, 5978, 5980, 5982, 5984, 5986, 5988, 5990, 5992, 5994, 5996, 5998, 6000,
6002, 6004, 6006, 6008, 6010, 6012, 6014, 6016, 6018, 6020, 6022, 6024, 6026,
6028, 6030, 6032, 6034, 6036, 6038, 6040, 6042, 6044, 6046, 6048, 6050, 6052,
6054, 6056, 6058, 6060, 6062, 6064, 6066, 6068, 6070, 6072, 6074, 6076, 6078,
6080, 6082, 6084, 6086, 6088, 6090, 6092, 6094, 6096, 6098, 6100, 6102, 6104,
6106, 6108, 6110, 6112, 6114, 6116, 6118, 6120, 6122, 6124, 6126, 6128, 6130,
6132, 6134, 6136, 6138, 6140, 6142, 6144, 6146, 6148, 6150, 6152, 6154, 6156,
6158, 6160, 6162, 6164, 6166, 6168, 6170, 6172, 6174, 6176, 6178, 6180, 6182,
6184, 6186, 6188, 6190, 6192, 6194, 6196, 6198, 6200, 6202, 6204, 6206, 6208,
6210, 6212, 6214, 6216, 6218, 6220, 6222, 6224, 6226, 6228, 6230, 6232, 6234,
6236, 6238, 6240, 6242, 6244, 6246, 6248, 6250, 6252, 6254, 6256, 6258, 6260,
6262, 6264, 6266, 6268, 6270, 6272, 6274, 6276, 6278, 6280, 6282, 6284, 6286,
6288, 6290, 6292, 6294, 6296, 6298, 6300, 6302, 6304, 6306, 6308, 6310, 6312,
6314, 6316, 6318, 6320, 6322, 6324, 6326, 6328, 6330, 6332, 6334, 6336, 6338,
6340, 6342, 6344, 6346, 6348, 6350, 6352, 6354, 6356, 6358, 6360, 6362, 6364,
6366, 6368, 6370, 6372, 6374, 6376, 6378, 6380, 6382, 6384, 6386, 6388, 6390,
6392, 6394, 6396, 6398, 6400, 6402, 6404, 6406, 6408, 6410, 6412, 6414, 6416,
6418, 6420, 6422, 6424, 6426, 6428, 6430, 6432, 6434, 6436, 6438, 6440, 6442,
6444, 6446, 6448, 6450, 6452, 6454, 6456, 6458, 6460, 6462, 6464, 6466, 6468,
6470, 6472, 6474, 6476, 6478, 6480, 6482, 6484, 6486, 6488, 6490, 6492, 6494,
6496, 6498, 6500, 6502, 6504, 6506, 6508, 6510, 6512, 6514, 6516, 6518, 6520,
6522, 6524, 6526, 6528, 6530, 6532, 6534, 6536, 6538, 6540, 6542, 6544, 6546,
6548, 6550, 6552, 6554, 6556, 6558, 6560, 6562, 6564, 6566, 6568, 6570, 6572,
6574, 6576, 6578, 6580, 6582, 6584, 6586, 6588, 6590, 6592, 6594, 6596, 6598,
6600, 6602, 6604, 6606, 6608, 6610, 6612, 6614, 6616, 6618, 6620, 6622, 6624,
6626, 6628, 6630, 6632, 6634, 6636, 6638, 6640, 6642, 6644, 6646, 6648, 6650,
6652, 6654, 6656, 6658, 6660, 6662, 6664, 6666, 6668, 6670, 6672, 6674, 6676,
6678, 6680, 6682, 6684, 6686, 6688, 6690, 6692, 6694, 6696, 6698, 6700, 6702,
6704, 6706, 6708, 6710, 6712, 6714, 6716, 6718, 6720, 6722, 6724, 6726, 6728,
6730, 6732, 6734, 6736, 6738, 6740, 6742, 6744, 6746, 6748, 6750, 6752, 6754,
6756, 6758, 6760, 6762, 6764, 6766, 6768, 6770, 6772, 6774, 6776, 6778, 6780,
6782, 6784, 6786, 6788, 6790, 6792, 6794, 6796, 6798, 6800, 6802, 6804, 6806,
6808, 6810, 6812, 6814, 6816, 6818, 6820, 6822, 6824, 6826, 6828, 6830, 6832,
6834, 6836, 6838, 6840, 6842, 6844, 6846, 6848, 6850, 6852, 6854, 6856, 6858,
6860, 6862, 6864, 6866, 6868, 6870, 6872, 6874, 6876, 6878, 6880, 6882, 6884,
6886, 6888, 6890, 6892, 6894, 6896, 6898, 6900, 6902, 6904, 6906, 6908, 6910,
6912, 6914, 6916, 6918, 6920, 6922, 6924, 6926, 6928, 6930, 6932, 6934, 6936,
6938, 6940, 6942, 6944, 6946, 6948, 6950, 6952, 6954, 6956, 6958, 6960, 6962,
6964, 6966, 6968, 6970, 6972, 6974, 6976, 6978, 6980, 6982, 6984, 6986, 6988,
6990, 6992, 6994, 6996, 6998, 7000, 7002, 7004, 7006, 7008, 7010, 7012, 7014,
7016, 7018, 7020, 7022, 7024, 7026, 7028, 7030, 7032, 7034, 7036, 7038, 7040,
7042, 7044, 7046, 7048, 7050, 7052, 7054, 7056, 7058, 7060, 7062, 7064, 7066,
7068, 7070, 7072, 7074, 7076, 7078, 7080, 7082, 7084, 7086, 7088, 7090, 7092,
7094, 7096, 7098, 7100, 7102, 7104, 7106, 7108, 7110, 7112, 7114, 7116, 7118,
7120, 7122, 7124, 7126, 7128, 7130, 7132, 7134, 7136, 7138, 7140, 7142, 7144,
7146, 7148, 7150, 7152, 7154, 7156, 7158, 7160, 7162, 7164, 7166, 7168, 7170,
7172, 7174, 7176, 7178, 7180, 7182, 7184, 7186, 7188, 7190, 7192, 7194, 7196,
7198, 7200, 7202, 7204, 7206, 7208, 7210, 7212, 7214, 7216, 7218, 7220, 7222,
7224, 7226, 7228, 7230, 7232, 7234, 7236, 7238, 7240, 7242, 7244, 7246, 7248,
7250, 7252, 7254, 7256, 7258, 7260, 7262, 7264, 7266, 7268, 7270, 7272, 7274,
7276, 7278, 7280, 7282, 7284, 7286, 7288, 7290, 7292, 7294, 7296, 7298, 7300,

7302, 7304, 7306, 7308, 7310, 7312, 7314, 7316, 7318, 7320, 7322, 7324, 7326, 7328, 7330, 7332, 7334, 7336, 7338, 7340, 7342, 7344, 7346, 7348, 7350, 7352, 7354, 7356, 7358, 7360, 7362, 7364, 7366, 7368, 7370, 7372, 7374, 7376, 7378, 7380, 7382, 7384, 7386, 7388, 7390, 7392, 7394, 7396, 7398, 7400, 7402, 7404, 7406, 7408, 7410, 7412, 7414, 7416, 7418, 7420, 7422, 7424, 7426, 7428, 7430, 7432, 7434, 7436, 7438, 7440, 7442, 7444, 7446, 7448, 7450, 7452, 7454, 7456, 7458, 7460, 7462, 7464, 7466, 7468, 7470, 7472, 7474, 7476, 7478, 7480, 7482, 7484, 7486, 7488, 7490, 7492, 7494, 7496, 7498, 7500, 7502, 7504, 7506, 7508, 7510, 7512, 7514, 7516, 7518, 7520, 7522, 7524, 7526, 7528, 7530, 7532, 7534, 7536, 7538, 7540, 7542, 7544, 7546, 7548, 7550, 7552, 7554, 7556, 7558, 7560, 7562, 7564, 7566, 7568, 7570, 7572, 7574, 7576, 7578, 7580, 7582, 7584, 7586, 7588, 7590, 7592, 7594, 7596, 7598, 7600, 7602, 7604, 7606, 7608, 7610, 7612, 7614, 7616, 7618, 7620, 7622, 7624, 7626, 7628, 7630, 7632, 7634, 7636, 7638, 7640, 7642, 7644, 7646, 7648, 7650, 7652, 7654, 7656, 7658, 7660, 7662, 7664, 7666, 7668, 7670, 7672, 7674, 7676, 7678, 7680, 7682, 7684, 7686, 7688, 7690, 7692, 7694, 7696, 7698, 7700, 7702, 7704, 7706, 7708, 7710, 7712, 7714, 7716, 7718, 7720, 7722, 7724, 7726, 7728, 7730, 7732, 7734, 7736, 7738, 7740, 7742, 7744, 7746, 7748, 7750, 7752, 7754, 7756, 7758, 7760, 7762, 7764, 7766, 7768, 7770, 7772, 7774, 7776, 7778, 7780, 7782, 7784, 7786, 7788, 7790, 7792, 7794, 7796, 7798, 7800, 7802, 7804, 7806, 7808, 7810, 7812, 7814, 7816, 7818, 7820, 7822, 7824, 7826, 7828, 7830, 7832, 7834, 7836, 7838, 7840, 7842, 7844, 7846, 7848, 7850, 7852, 7854, 7856, 7858, 7860, 7862, 7864, 7866, 7868, 7870, 7872, 7874, 7876, 7878, 7880, 7882, 7884, 7886, 7888, 7890, 7892, 7894, 7896, 7898, 7900, 7902, 7904, 7906, 7908, 7910, 7912, 7914, 7916, 7918, 7920, 7922, 7924, 7926, 7928, 7930, 7932, 7934, 7936, 7938, 7940, 7942, 7944, 7946, 7948, 7950, 7952, 7954, 7956, 7958, 7960, 7962, 7964, 7966, 7968, 7970, 7972, 7974, 7976, 7978, 7980, 7982, 7984, 7986, 7988, 7990, 7992, 7994, 7996, 7998, 8000, 8002, 8004, 8006, 8008, 8010, 8012, 8014, 8016, 8018, 8020, 8022, 8024, 8026, 8028, 8030, 8032, 8034, 8036, 8038, 8040, 8042, 8044, 8046, 8048, 8050, 8052, 8054, 8056, 8058, 8060, 8062, 8064, 8066, 8068, 8070, 8072, 8074, 8076, 8078, 8080, 8082, 8084, 8086, 8088, 8090, 8092, 8094, 8096, 8098, 8100, 8102, 8104, 8106, 8108, 8110, 8112, 8114, 8116, 8118, 8120, 8122, 8124, 8126, 8128, 8130, 8132, 8134, 8136, 8138, 8140, 8142, 8144, 8146, 8148, 8150, 8152, 8154, 8156, 8158, 8160, 8162, 8164, 8166, 8168, 8170, 8172, 8174, 8176, 8178, 8180, 8182, 8184, 8186, 8188, 8190, 8192, 8194, 8196, 8198, 8200, 8202, 8204, 8206, 8208, 8210, 8212, 8214, 8216, 8218, 8220, 8222, 8224, 8226, 8228, 8230, 8232, 8234, 8236, 8238, 8240, 8242, 8244, 8246, 8248, 8250, 8252, 8254, 8256, 8258, 8260, 8262, 8264, 8266, 8268, 8270, 8272, 8274, 8276, 8278, 8280, 8282, 8284, 8286, 8288, 8290, 8292, 8294, 8296, 8298, 8300, 8302, 8304, 8306, 8308, 8310, 8312, 8314, 8316, 8318, 8320, 8322, 8324, 8326, 8328, 8330, 8332, 8334, 8336, 8338, 8340, 8342, 8344, 8346, 8348, 8350, 8352, 8354, 8356, 8358, 8360, 8362, 8364, 8366, 8368, 8370, 8372, 8374, 8376, 8378, 8380, 8382, 8384, 8386, 8388, 8390, 8392, 8394, 8396, 8398, 8400, 8402, 8404, 8406, 8408, 8410, 8412, 8414, 8416, 8418, 8420, 8422, 8424, 8426, 8428, 8430, 8432, 8434, 8436, 8438, 8440, 8442, 8444, 8446, 8448, 8450, 8452, 8454, 8456, 8458, 8460, 8462, 8464, 8466, 8468, 8470, 8472, 8474, 8476, 8478, 8480, 8482, 8484, 8486, 8488, 8490, 8492, 8494, 8496, 8498, 8500, 8502, 8504, 8506, 8508, 8510, 8512, 8514, 8516, 8518, 8520, 8522, 8524, 8526, 8528, 8530, 8532, 8534, 8536, 8538, 8540, 8542, 8544, 8546, 8548, 8550, 8552, 8554, 8556, 8558, 8560, 8562, 8564, 8566, 8568, 8570, 8572, 8574, 8576, 8578, 8580, 8582, 8584, 8586, 8588, 8590, 8592, 8594, 8596, 8598, 8600, 8602, 8604, 8606, 8608, 8610, 8612, 8614, 8616, 8618, 8620, 8622, 8624, 8626, 8628, 8630, 8632, 8634, 8636, 8638, 8640, 8642, 8644, 8646, 8648, 8650, 8652, 8654, 8656, 8658, 8660, 8662, 8664, 8666, 8668, 8670, 8672, 8674, 8676, 8678, 8680, 8682, 8684, 8686, 8688, 8690, 8692, 8694, 8696, 8698, 8700, 8702, 8704, 8706, 8708, 8710, 8712, 8714, 8716, 8718, 8720, 8722, 8724, 8726, 8728, 8730,

8732, 8734, 8736, 8738, 8740, 8742, 8744, 8746, 8748, 8750, 8752, 8754, 8756,
8758, 8760, 8762, 8764, 8766, 8768, 8770, 8772, 8774, 8776, 8778, 8780, 8782,
8784, 8786, 8788, 8790, 8792, 8794, 8796, 8798, 8800, 8802, 8804, 8806, 8808,
8810, 8812, 8814, 8816, 8818, 8820, 8822, 8824, 8826, 8828, 8830, 8832, 8834,
8836, 8838, 8840, 8842, 8844, 8846, 8848, 8850, 8852, 8854, 8856, 8858, 8860,
8862, 8864, 8866, 8868, 8870, 8872, 8874, 8876, 8878, 8880, 8882, 8884, 8886,
8888, 8890, 8892, 8894, 8896, 8898, 8900, 8902, 8904, 8906, 8908, 8910, 8912,
8914, 8916, 8918, 8920, 8922, 8924, 8926, 8928, 8930, 8932, 8934, 8936, 8938,
8940, 8942, 8944, 8946, 8948, 8950, 8952, 8954, 8956, 8958, 8960, 8962, 8964,
8966, 8968, 8970, 8972, 8974, 8976, 8978, 8980, 8982, 8984, 8986, 8988, 8990,
8992, 8994, 8996, 8998, 9000, 9002, 9004, 9006, 9008, 9010, 9012, 9014, 9016,
9018, 9020, 9022, 9024, 9026, 9028, 9030, 9032, 9034, 9036, 9038, 9040, 9042,
9044, 9046, 9048, 9050, 9052, 9054, 9056, 9058, 9060, 9062, 9064, 9066, 9068,
9070, 9072, 9074, 9076, 9078, 9080, 9082, 9084, 9086, 9088, 9090, 9092, 9094,
9096, 9098, 9100, 9102, 9104, 9106, 9108, 9110, 9112, 9114, 9116, 9118, 9120,
9122, 9124, 9126, 9128, 9130, 9132, 9134, 9136, 9138, 9140, 9142, 9144, 9146,
9148, 9150, 9152, 9154, 9156, 9158, 9160, 9162, 9164, 9166, 9168, 9170, 9172,
9174, 9176, 9178, 9180, 9182, 9184, 9186, 9188, 9190, 9192, 9194, 9196, 9198,
9200, 9202, 9204, 9206, 9208, 9210, 9212, 9214, 9216, 9218, 9220, 9222, 9224,
9226, 9228, 9230, 9232, 9234, 9236, 9238, 9240, 9242, 9244, 9246, 9248, 9250,
9252, 9254, 9256, 9258, 9260, 9262, 9264, 9266, 9268, 9270, 9272, 9274, 9276,
9278, 9280, 9282, 9284, 9286, 9288, 9290, 9292, 9294, 9296, 9298, 9300, 9302,
9304, 9306, 9308, 9310, 9312, 9314, 9316, 9318, 9320, 9322, 9324, 9326, 9328,
9330, 9332, 9334, 9336, 9338, 9340, 9342, 9344, 9346, 9348, 9350, 9352, 9354,
9356, 9358, 9360, 9362, 9364, 9366, 9368, 9370, 9372, 9374, 9376, 9378, 9380,
9382, 9384, 9386, 9388, 9390, 9392, 9394, 9396, 9398, 9400, 9402, 9404, 9406,
9408, 9410, 9412, 9414, 9416, 9418, 9420, 9422, 9424, 9426, 9428, 9430, 9432,
9434, 9436, 9438, 9440, 9442, 9444, 9446, 9448, 9450, 9452, 9454, 9456, 9458,
9460, 9462, 9464, 9466, 9468, 9470, 9472, 9474, 9476, 9478, 9480, 9482, 9484,
9486, 9488, 9490, 9492, 9494, 9496, 9498, 9500, 9502, 9504, 9506, 9508, 9510,
9512, 9514, 9516, 9518, 9520, 9522, 9524, 9526, 9528, 9530, 9532, 9534, 9536,
9538, 9540, 9542, 9544, 9546, 9548, 9550, 9552, 9554, 9556, 9558, 9560, 9562,
9564, 9566, 9568, 9570, 9572, 9574, 9576, 9578, 9580, 9582, 9584, 9586, 9588,
9590, 9592, 9594, 9596, 9598, 9600, 9602, 9604, 9606, 9608, 9610, 9612, 9614,
9616, 9618, 9620, 9622, 9624, 9626, 9628, 9630, 9632, 9634, 9636, 9638, 9640,
9642, 9644, 9646, 9648, 9650, 9652, 9654, 9656, 9658, 9660, 9662, 9664, 9666,
9668, 9670, 9672, 9674, 9676, 9678, 9680, 9682, 9684, 9686, 9688, 9690, 9692,
9694, 9696, 9698, 9700, 9702, 9704, 9706, 9708, 9710, 9712, 9714, 9716, 9718,
9720, 9722, 9724, 9726, 9728, 9730, 9732, 9734, 9736, 9738, 9740, 9742, 9744,
9746, 9748, 9750, 9752, 9754, 9756, 9758, 9760, 9762, 9764, 9766, 9768, 9770,
9772, 9774, 9776, 9778, 9780, 9782, 9784, 9786, 9788, 9790, 9792, 9794, 9796,
9798, 9800, 9802, 9804, 9806, 9808, 9810, 9812, 9814, 9816, 9818, 9820, 9822,
9824, 9826, 9828, 9830, 9832, 9834, 9836, 9838, 9840, 9842, 9844, 9846, 9848,
9850, 9852, 9854, 9856, 9858, 9860, 9862, 9864, 9866, 9868, 9870, 9872, 9874,
9876, 9878, 9880, 9882, 9884, 9886, 9888, 9890, 9892, 9894, 9896, 9898, 9900,
9902, 9904, 9906, 9908, 9910, 9912, 9914, 9916, 9918, 9920, 9922, 9924, 9926,
9928, 9930, 9932, 9934, 9936, 9938, 9940, 9942, 9944, 9946, 9948, 9950, 9952,
9954, 9956, 9958, 9960, 9962, 9964, 9966, 9968, 9970, 9972, 9974, 9976, 9978,
9980, 9982, 9984, 9986, 9988, 9990, 9992, 9994, 9996, 9998]

[1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581,

1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607,
1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633,
1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659,
1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685,
1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711,
1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737,
1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763,
1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789,
1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815,
1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841,
1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867,
1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893,
1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919,
1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945,
1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971,
1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997,
1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023,
2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049,
2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075,
2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101,
2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127,
2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153,
2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179,
2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205,
2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231,
2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257,
2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283,
2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309,
2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335,
2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361,
2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387,
2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413,
2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439,
2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465,
2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491,
2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517,
2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543,
2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569,
2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595,
2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621,
2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647,
2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673,
2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699,
2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725,
2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751,
2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777,
2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803,
2805, 2807, 2809, 2811, 2813, 2815, 2817, 2819, 2821, 2823, 2825, 2827, 2829,
2831, 2833, 2835, 2837, 2839, 2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855,
2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881,
2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907,
2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933,
2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959,
2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985,
2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011,

3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037,
3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063,
3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089,
3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115,
3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141,
3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167,
3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193,
3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219,
3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245,
3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271,
3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297,
3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323,
3325, 3327, 3329, 3331, 3333, 3335, 3337, 3339, 3341, 3343, 3345, 3347, 3349,
3351, 3353, 3355, 3357, 3359, 3361, 3363, 3365, 3367, 3369, 3371, 3373, 3375,
3377, 3379, 3381, 3383, 3385, 3387, 3389, 3391, 3393, 3395, 3397, 3399, 3401,
3403, 3405, 3407, 3409, 3411, 3413, 3415, 3417, 3419, 3421, 3423, 3425, 3427,
3429, 3431, 3433, 3435, 3437, 3439, 3441, 3443, 3445, 3447, 3449, 3451, 3453,
3455, 3457, 3459, 3461, 3463, 3465, 3467, 3469, 3471, 3473, 3475, 3477, 3479,
3481, 3483, 3485, 3487, 3489, 3491, 3493, 3495, 3497, 3499, 3501, 3503, 3505,
3507, 3509, 3511, 3513, 3515, 3517, 3519, 3521, 3523, 3525, 3527, 3529, 3531,
3533, 3535, 3537, 3539, 3541, 3543, 3545, 3547, 3549, 3551, 3553, 3555, 3557,
3559, 3561, 3563, 3565, 3567, 3569, 3571, 3573, 3575, 3577, 3579, 3581, 3583,
3585, 3587, 3589, 3591, 3593, 3595, 3597, 3599, 3601, 3603, 3605, 3607, 3609,
3611, 3613, 3615, 3617, 3619, 3621, 3623, 3625, 3627, 3629, 3631, 3633, 3635,
3637, 3639, 3641, 3643, 3645, 3647, 3649, 3651, 3653, 3655, 3657, 3659, 3661,
3663, 3665, 3667, 3669, 3671, 3673, 3675, 3677, 3679, 3681, 3683, 3685, 3687,
3689, 3691, 3693, 3695, 3697, 3699, 3701, 3703, 3705, 3707, 3709, 3711, 3713,
3715, 3717, 3719, 3721, 3723, 3725, 3727, 3729, 3731, 3733, 3735, 3737, 3739,
3741, 3743, 3745, 3747, 3749, 3751, 3753, 3755, 3757, 3759, 3761, 3763, 3765,
3767, 3769, 3771, 3773, 3775, 3777, 3779, 3781, 3783, 3785, 3787, 3789, 3791,
3793, 3795, 3797, 3799, 3801, 3803, 3805, 3807, 3809, 3811, 3813, 3815, 3817,
3819, 3821, 3823, 3825, 3827, 3829, 3831, 3833, 3835, 3837, 3839, 3841, 3843,
3845, 3847, 3849, 3851, 3853, 3855, 3857, 3859, 3861, 3863, 3865, 3867, 3869,
3871, 3873, 3875, 3877, 3879, 3881, 3883, 3885, 3887, 3889, 3891, 3893, 3895,
3897, 3899, 3901, 3903, 3905, 3907, 3909, 3911, 3913, 3915, 3917, 3919, 3921,
3923, 3925, 3927, 3929, 3931, 3933, 3935, 3937, 3939, 3941, 3943, 3945, 3947,
3949, 3951, 3953, 3955, 3957, 3959, 3961, 3963, 3965, 3967, 3969, 3971, 3973,
3975, 3977, 3979, 3981, 3983, 3985, 3987, 3989, 3991, 3993, 3995, 3997, 3999,
4001, 4003, 4005, 4007, 4009, 4011, 4013, 4015, 4017, 4019, 4021, 4023, 4025,
4027, 4029, 4031, 4033, 4035, 4037, 4039, 4041, 4043, 4045, 4047, 4049, 4051,
4053, 4055, 4057, 4059, 4061, 4063, 4065, 4067, 4069, 4071, 4073, 4075, 4077,
4079, 4081, 4083, 4085, 4087, 4089, 4091, 4093, 4095, 4097, 4099, 4101, 4103,
4105, 4107, 4109, 4111, 4113, 4115, 4117, 4119, 4121, 4123, 4125, 4127, 4129,
4131, 4133, 4135, 4137, 4139, 4141, 4143, 4145, 4147, 4149, 4151, 4153, 4155,
4157, 4159, 4161, 4163, 4165, 4167, 4169, 4171, 4173, 4175, 4177, 4179, 4181,
4183, 4185, 4187, 4189, 4191, 4193, 4195, 4197, 4199, 4201, 4203, 4205, 4207,
4209, 4211, 4213, 4215, 4217, 4219, 4221, 4223, 4225, 4227, 4229, 4231, 4233,
4235, 4237, 4239, 4241, 4243, 4245, 4247, 4249, 4251, 4253, 4255, 4257, 4259,
4261, 4263, 4265, 4267, 4269, 4271, 4273, 4275, 4277, 4279, 4281, 4283, 4285,
4287, 4289, 4291, 4293, 4295, 4297, 4299, 4301, 4303, 4305, 4307, 4309, 4311,
4313, 4315, 4317, 4319, 4321, 4323, 4325, 4327, 4329, 4331, 4333, 4335, 4337,
4339, 4341, 4343, 4345, 4347, 4349, 4351, 4353, 4355, 4357, 4359, 4361, 4363,
4365, 4367, 4369, 4371, 4373, 4375, 4377, 4379, 4381, 4383, 4385, 4387, 4389,
4391, 4393, 4395, 4397, 4399, 4401, 4403, 4405, 4407, 4409, 4411, 4413, 4415,
4417, 4419, 4421, 4423, 4425, 4427, 4429, 4431, 4433, 4435, 4437, 4439, 4441,

4443, 4445, 4447, 4449, 4451, 4453, 4455, 4457, 4459, 4461, 4463, 4465, 4467,
4469, 4471, 4473, 4475, 4477, 4479, 4481, 4483, 4485, 4487, 4489, 4491, 4493,
4495, 4497, 4499, 4501, 4503, 4505, 4507, 4509, 4511, 4513, 4515, 4517, 4519,
4521, 4523, 4525, 4527, 4529, 4531, 4533, 4535, 4537, 4539, 4541, 4543, 4545,
4547, 4549, 4551, 4553, 4555, 4557, 4559, 4561, 4563, 4565, 4567, 4569, 4571,
4573, 4575, 4577, 4579, 4581, 4583, 4585, 4587, 4589, 4591, 4593, 4595, 4597,
4599, 4601, 4603, 4605, 4607, 4609, 4611, 4613, 4615, 4617, 4619, 4621, 4623,
4625, 4627, 4629, 4631, 4633, 4635, 4637, 4639, 4641, 4643, 4645, 4647, 4649,
4651, 4653, 4655, 4657, 4659, 4661, 4663, 4665, 4667, 4669, 4671, 4673, 4675,
4677, 4679, 4681, 4683, 4685, 4687, 4689, 4691, 4693, 4695, 4697, 4699, 4701,
4703, 4705, 4707, 4709, 4711, 4713, 4715, 4717, 4719, 4721, 4723, 4725, 4727,
4729, 4731, 4733, 4735, 4737, 4739, 4741, 4743, 4745, 4747, 4749, 4751, 4753,
4755, 4757, 4759, 4761, 4763, 4765, 4767, 4769, 4771, 4773, 4775, 4777, 4779,
4781, 4783, 4785, 4787, 4789, 4791, 4793, 4795, 4797, 4799, 4801, 4803, 4805,
4807, 4809, 4811, 4813, 4815, 4817, 4819, 4821, 4823, 4825, 4827, 4829, 4831,
4833, 4835, 4837, 4839, 4841, 4843, 4845, 4847, 4849, 4851, 4853, 4855, 4857,
4859, 4861, 4863, 4865, 4867, 4869, 4871, 4873, 4875, 4877, 4879, 4881, 4883,
4885, 4887, 4889, 4891, 4893, 4895, 4897, 4899, 4901, 4903, 4905, 4907, 4909,
4911, 4913, 4915, 4917, 4919, 4921, 4923, 4925, 4927, 4929, 4931, 4933, 4935,
4937, 4939, 4941, 4943, 4945, 4947, 4949, 4951, 4953, 4955, 4957, 4959, 4961,
4963, 4965, 4967, 4969, 4971, 4973, 4975, 4977, 4979, 4981, 4983, 4985, 4987,
4989, 4991, 4993, 4995, 4997, 4999, 5001, 5003, 5005, 5007, 5009, 5011, 5013,
5015, 5017, 5019, 5021, 5023, 5025, 5027, 5029, 5031, 5033, 5035, 5037, 5039,
5041, 5043, 5045, 5047, 5049, 5051, 5053, 5055, 5057, 5059, 5061, 5063, 5065,
5067, 5069, 5071, 5073, 5075, 5077, 5079, 5081, 5083, 5085, 5087, 5089, 5091,
5093, 5095, 5097, 5099, 5101, 5103, 5105, 5107, 5109, 5111, 5113, 5115, 5117,
5119, 5121, 5123, 5125, 5127, 5129, 5131, 5133, 5135, 5137, 5139, 5141, 5143,
5145, 5147, 5149, 5151, 5153, 5155, 5157, 5159, 5161, 5163, 5165, 5167, 5169,
5171, 5173, 5175, 5177, 5179, 5181, 5183, 5185, 5187, 5189, 5191, 5193, 5195,
5197, 5199, 5201, 5203, 5205, 5207, 5209, 5211, 5213, 5215, 5217, 5219, 5221,
5223, 5225, 5227, 5229, 5231, 5233, 5235, 5237, 5239, 5241, 5243, 5245, 5247,
5249, 5251, 5253, 5255, 5257, 5259, 5261, 5263, 5265, 5267, 5269, 5271, 5273,
5275, 5277, 5279, 5281, 5283, 5285, 5287, 5289, 5291, 5293, 5295, 5297, 5299,
5301, 5303, 5305, 5307, 5309, 5311, 5313, 5315, 5317, 5319, 5321, 5323, 5325,
5327, 5329, 5331, 5333, 5335, 5337, 5339, 5341, 5343, 5345, 5347, 5349, 5351,
5353, 5355, 5357, 5359, 5361, 5363, 5365, 5367, 5369, 5371, 5373, 5375, 5377,
5379, 5381, 5383, 5385, 5387, 5389, 5391, 5393, 5395, 5397, 5399, 5401, 5403,
5405, 5407, 5409, 5411, 5413, 5415, 5417, 5419, 5421, 5423, 5425, 5427, 5429,
5431, 5433, 5435, 5437, 5439, 5441, 5443, 5445, 5447, 5449, 5451, 5453, 5455,
5457, 5459, 5461, 5463, 5465, 5467, 5469, 5471, 5473, 5475, 5477, 5479, 5481,
5483, 5485, 5487, 5489, 5491, 5493, 5495, 5497, 5499, 5501, 5503, 5505, 5507,
5509, 5511, 5513, 5515, 5517, 5519, 5521, 5523, 5525, 5527, 5529, 5531, 5533,
5535, 5537, 5539, 5541, 5543, 5545, 5547, 5549, 5551, 5553, 5555, 5557, 5559,
5561, 5563, 5565, 5567, 5569, 5571, 5573, 5575, 5577, 5579, 5581, 5583, 5585,
5587, 5589, 5591, 5593, 5595, 5597, 5599, 5601, 5603, 5605, 5607, 5609, 5611,
5613, 5615, 5617, 5619, 5621, 5623, 5625, 5627, 5629, 5631, 5633, 5635, 5637,
5639, 5641, 5643, 5645, 5647, 5649, 5651, 5653, 5655, 5657, 5659, 5661, 5663,
5665, 5667, 5669, 5671, 5673, 5675, 5677, 5679, 5681, 5683, 5685, 5687, 5689,
5691, 5693, 5695, 5697, 5699, 5701, 5703, 5705, 5707, 5709, 5711, 5713, 5715,
5717, 5719, 5721, 5723, 5725, 5727, 5729, 5731, 5733, 5735, 5737, 5739, 5741,
5743, 5745, 5747, 5749, 5751, 5753, 5755, 5757, 5759, 5761, 5763, 5765, 5767,
5769, 5771, 5773, 5775, 5777, 5779, 5781, 5783, 5785, 5787, 5789, 5791, 5793,
5795, 5797, 5799, 5801, 5803, 5805, 5807, 5809, 5811, 5813, 5815, 5817, 5819,
5821, 5823, 5825, 5827, 5829, 5831, 5833, 5835, 5837, 5839, 5841, 5843, 5845,
5847, 5849, 5851, 5853, 5855, 5857, 5859, 5861, 5863, 5865, 5867, 5869, 5871,

5873, 5875, 5877, 5879, 5881, 5883, 5885, 5887, 5889, 5891, 5893, 5895, 5897,
5899, 5901, 5903, 5905, 5907, 5909, 5911, 5913, 5915, 5917, 5919, 5921, 5923,
5925, 5927, 5929, 5931, 5933, 5935, 5937, 5939, 5941, 5943, 5945, 5947, 5949,
5951, 5953, 5955, 5957, 5959, 5961, 5963, 5965, 5967, 5969, 5971, 5973, 5975,
5977, 5979, 5981, 5983, 5985, 5987, 5989, 5991, 5993, 5995, 5997, 5999, 6001,
6003, 6005, 6007, 6009, 6011, 6013, 6015, 6017, 6019, 6021, 6023, 6025, 6027,
6029, 6031, 6033, 6035, 6037, 6039, 6041, 6043, 6045, 6047, 6049, 6051, 6053,
6055, 6057, 6059, 6061, 6063, 6065, 6067, 6069, 6071, 6073, 6075, 6077, 6079,
6081, 6083, 6085, 6087, 6089, 6091, 6093, 6095, 6097, 6099, 6101, 6103, 6105,
6107, 6109, 6111, 6113, 6115, 6117, 6119, 6121, 6123, 6125, 6127, 6129, 6131,
6133, 6135, 6137, 6139, 6141, 6143, 6145, 6147, 6149, 6151, 6153, 6155, 6157,
6159, 6161, 6163, 6165, 6167, 6169, 6171, 6173, 6175, 6177, 6179, 6181, 6183,
6185, 6187, 6189, 6191, 6193, 6195, 6197, 6199, 6201, 6203, 6205, 6207, 6209,
6211, 6213, 6215, 6217, 6219, 6221, 6223, 6225, 6227, 6229, 6231, 6233, 6235,
6237, 6239, 6241, 6243, 6245, 6247, 6249, 6251, 6253, 6255, 6257, 6259, 6261,
6263, 6265, 6267, 6269, 6271, 6273, 6275, 6277, 6279, 6281, 6283, 6285, 6287,
6289, 6291, 6293, 6295, 6297, 6299, 6301, 6303, 6305, 6307, 6309, 6311, 6313,
6315, 6317, 6319, 6321, 6323, 6325, 6327, 6329, 6331, 6333, 6335, 6337, 6339,
6341, 6343, 6345, 6347, 6349, 6351, 6353, 6355, 6357, 6359, 6361, 6363, 6365,
6367, 6369, 6371, 6373, 6375, 6377, 6379, 6381, 6383, 6385, 6387, 6389, 6391,
6393, 6395, 6397, 6399, 6401, 6403, 6405, 6407, 6409, 6411, 6413, 6415, 6417,
6419, 6421, 6423, 6425, 6427, 6429, 6431, 6433, 6435, 6437, 6439, 6441, 6443,
6445, 6447, 6449, 6451, 6453, 6455, 6457, 6459, 6461, 6463, 6465, 6467, 6469,
6471, 6473, 6475, 6477, 6479, 6481, 6483, 6485, 6487, 6489, 6491, 6493, 6495,
6497, 6499, 6501, 6503, 6505, 6507, 6509, 6511, 6513, 6515, 6517, 6519, 6521,
6523, 6525, 6527, 6529, 6531, 6533, 6535, 6537, 6539, 6541, 6543, 6545, 6547,
6549, 6551, 6553, 6555, 6557, 6559, 6561, 6563, 6565, 6567, 6569, 6571, 6573,
6575, 6577, 6579, 6581, 6583, 6585, 6587, 6589, 6591, 6593, 6595, 6597, 6599,
6601, 6603, 6605, 6607, 6609, 6611, 6613, 6615, 6617, 6619, 6621, 6623, 6625,
6627, 6629, 6631, 6633, 6635, 6637, 6639, 6641, 6643, 6645, 6647, 6649, 6651,
6653, 6655, 6657, 6659, 6661, 6663, 6665, 6667, 6669, 6671, 6673, 6675, 6677,
6679, 6681, 6683, 6685, 6687, 6689, 6691, 6693, 6695, 6697, 6699, 6701, 6703,
6705, 6707, 6709, 6711, 6713, 6715, 6717, 6719, 6721, 6723, 6725, 6727, 6729,
6731, 6733, 6735, 6737, 6739, 6741, 6743, 6745, 6747, 6749, 6751, 6753, 6755,
6757, 6759, 6761, 6763, 6765, 6767, 6769, 6771, 6773, 6775, 6777, 6779, 6781,
6783, 6785, 6787, 6789, 6791, 6793, 6795, 6797, 6799, 6801, 6803, 6805, 6807,
6809, 6811, 6813, 6815, 6817, 6819, 6821, 6823, 6825, 6827, 6829, 6831, 6833,
6835, 6837, 6839, 6841, 6843, 6845, 6847, 6849, 6851, 6853, 6855, 6857, 6859,
6861, 6863, 6865, 6867, 6869, 6871, 6873, 6875, 6877, 6879, 6881, 6883, 6885,
6887, 6889, 6891, 6893, 6895, 6897, 6899, 6901, 6903, 6905, 6907, 6909, 6911,
6913, 6915, 6917, 6919, 6921, 6923, 6925, 6927, 6929, 6931, 6933, 6935, 6937,
6939, 6941, 6943, 6945, 6947, 6949, 6951, 6953, 6955, 6957, 6959, 6961, 6963,
6965, 6967, 6969, 6971, 6973, 6975, 6977, 6979, 6981, 6983, 6985, 6987, 6989,
6991, 6993, 6995, 6997, 6999, 7001, 7003, 7005, 7007, 7009, 7011, 7013, 7015,
7017, 7019, 7021, 7023, 7025, 7027, 7029, 7031, 7033, 7035, 7037, 7039, 7041,
7043, 7045, 7047, 7049, 7051, 7053, 7055, 7057, 7059, 7061, 7063, 7065, 7067,
7069, 7071, 7073, 7075, 7077, 7079, 7081, 7083, 7085, 7087, 7089, 7091, 7093,
7095, 7097, 7099, 7101, 7103, 7105, 7107, 7109, 7111, 7113, 7115, 7117, 7119,
7121, 7123, 7125, 7127, 7129, 7131, 7133, 7135, 7137, 7139, 7141, 7143, 7145,
7147, 7149, 7151, 7153, 7155, 7157, 7159, 7161, 7163, 7165, 7167, 7169, 7171,
7173, 7175, 7177, 7179, 7181, 7183, 7185, 7187, 7189, 7191, 7193, 7195, 7197,
7199, 7201, 7203, 7205, 7207, 7209, 7211, 7213, 7215, 7217, 7219, 7221, 7223,
7225, 7227, 7229, 7231, 7233, 7235, 7237, 7239, 7241, 7243, 7245, 7247, 7249,
7251, 7253, 7255, 7257, 7259, 7261, 7263, 7265, 7267, 7269, 7271, 7273, 7275,
7277, 7279, 7281, 7283, 7285, 7287, 7289, 7291, 7293, 7295, 7297, 7299, 7301,

7303, 7305, 7307, 7309, 7311, 7313, 7315, 7317, 7319, 7321, 7323, 7325, 7327, 7329, 7331, 7333, 7335, 7337, 7339, 7341, 7343, 7345, 7347, 7349, 7351, 7353, 7355, 7357, 7359, 7361, 7363, 7365, 7367, 7369, 7371, 7373, 7375, 7377, 7379, 7381, 7383, 7385, 7387, 7389, 7391, 7393, 7395, 7397, 7399, 7401, 7403, 7405, 7407, 7409, 7411, 7413, 7415, 7417, 7419, 7421, 7423, 7425, 7427, 7429, 7431, 7433, 7435, 7437, 7439, 7441, 7443, 7445, 7447, 7449, 7451, 7453, 7455, 7457, 7459, 7461, 7463, 7465, 7467, 7469, 7471, 7473, 7475, 7477, 7479, 7481, 7483, 7485, 7487, 7489, 7491, 7493, 7495, 7497, 7499, 7501, 7503, 7505, 7507, 7509, 7511, 7513, 7515, 7517, 7519, 7521, 7523, 7525, 7527, 7529, 7531, 7533, 7535, 7537, 7539, 7541, 7543, 7545, 7547, 7549, 7551, 7553, 7555, 7557, 7559, 7561, 7563, 7565, 7567, 7569, 7571, 7573, 7575, 7577, 7579, 7581, 7583, 7585, 7587, 7589, 7591, 7593, 7595, 7597, 7599, 7601, 7603, 7605, 7607, 7609, 7611, 7613, 7615, 7617, 7619, 7621, 7623, 7625, 7627, 7629, 7631, 7633, 7635, 7637, 7639, 7641, 7643, 7645, 7647, 7649, 7651, 7653, 7655, 7657, 7659, 7661, 7663, 7665, 7667, 7669, 7671, 7673, 7675, 7677, 7679, 7681, 7683, 7685, 7687, 7689, 7691, 7693, 7695, 7697, 7699, 7701, 7703, 7705, 7707, 7709, 7711, 7713, 7715, 7717, 7719, 7721, 7723, 7725, 7727, 7729, 7731, 7733, 7735, 7737, 7739, 7741, 7743, 7745, 7747, 7749, 7751, 7753, 7755, 7757, 7759, 7761, 7763, 7765, 7767, 7769, 7771, 7773, 7775, 7777, 7779, 7781, 7783, 7785, 7787, 7789, 7791, 7793, 7795, 7797, 7799, 7801, 7803, 7805, 7807, 7809, 7811, 7813, 7815, 7817, 7819, 7821, 7823, 7825, 7827, 7829, 7831, 7833, 7835, 7837, 7839, 7841, 7843, 7845, 7847, 7849, 7851, 7853, 7855, 7857, 7859, 7861, 7863, 7865, 7867, 7869, 7871, 7873, 7875, 7877, 7879, 7881, 7883, 7885, 7887, 7889, 7891, 7893, 7895, 7897, 7899, 7901, 7903, 7905, 7907, 7909, 7911, 7913, 7915, 7917, 7919, 7921, 7923, 7925, 7927, 7929, 7931, 7933, 7935, 7937, 7939, 7941, 7943, 7945, 7947, 7949, 7951, 7953, 7955, 7957, 7959, 7961, 7963, 7965, 7967, 7969, 7971, 7973, 7975, 7977, 7979, 7981, 7983, 7985, 7987, 7989, 7991, 7993, 7995, 7997, 7999, 8001, 8003, 8005, 8007, 8009, 8011, 8013, 8015, 8017, 8019, 8021, 8023, 8025, 8027, 8029, 8031, 8033, 8035, 8037, 8039, 8041, 8043, 8045, 8047, 8049, 8051, 8053, 8055, 8057, 8059, 8061, 8063, 8065, 8067, 8069, 8071, 8073, 8075, 8077, 8079, 8081, 8083, 8085, 8087, 8089, 8091, 8093, 8095, 8097, 8099, 8101, 8103, 8105, 8107, 8109, 8111, 8113, 8115, 8117, 8119, 8121, 8123, 8125, 8127, 8129, 8131, 8133, 8135, 8137, 8139, 8141, 8143, 8145, 8147, 8149, 8151, 8153, 8155, 8157, 8159, 8161, 8163, 8165, 8167, 8169, 8171, 8173, 8175, 8177, 8179, 8181, 8183, 8185, 8187, 8189, 8191, 8193, 8195, 8197, 8199, 8201, 8203, 8205, 8207, 8209, 8211, 8213, 8215, 8217, 8219, 8221, 8223, 8225, 8227, 8229, 8231, 8233, 8235, 8237, 8239, 8241, 8243, 8245, 8247, 8249, 8251, 8253, 8255, 8257, 8259, 8261, 8263, 8265, 8267, 8269, 8271, 8273, 8275, 8277, 8279, 8281, 8283, 8285, 8287, 8289, 8291, 8293, 8295, 8297, 8299, 8301, 8303, 8305, 8307, 8309, 8311, 8313, 8315, 8317, 8319, 8321, 8323, 8325, 8327, 8329, 8331, 8333, 8335, 8337, 8339, 8341, 8343, 8345, 8347, 8349, 8351, 8353, 8355, 8357, 8359, 8361, 8363, 8365, 8367, 8369, 8371, 8373, 8375, 8377, 8379, 8381, 8383, 8385, 8387, 8389, 8391, 8393, 8395, 8397, 8399, 8401, 8403, 8405, 8407, 8409, 8411, 8413, 8415, 8417, 8419, 8421, 8423, 8425, 8427, 8429, 8431, 8433, 8435, 8437, 8439, 8441, 8443, 8445, 8447, 8449, 8451, 8453, 8455, 8457, 8459, 8461, 8463, 8465, 8467, 8469, 8471, 8473, 8475, 8477, 8479, 8481, 8483, 8485, 8487, 8489, 8491, 8493, 8495, 8497, 8499, 8501, 8503, 8505, 8507, 8509, 8511, 8513, 8515, 8517, 8519, 8521, 8523, 8525, 8527, 8529, 8531, 8533, 8535, 8537, 8539, 8541, 8543, 8545, 8547, 8549, 8551, 8553, 8555, 8557, 8559, 8561, 8563, 8565, 8567, 8569, 8571, 8573, 8575, 8577, 8579, 8581, 8583, 8585, 8587, 8589, 8591, 8593, 8595, 8597, 8599, 8601, 8603, 8605, 8607, 8609, 8611, 8613, 8615, 8617, 8619, 8621, 8623, 8625, 8627, 8629, 8631, 8633, 8635, 8637, 8639, 8641, 8643, 8645, 8647, 8649, 8651, 8653, 8655, 8657, 8659, 8661, 8663, 8665, 8667, 8669, 8671, 8673, 8675, 8677, 8679, 8681, 8683, 8685, 8687, 8689, 8691, 8693, 8695, 8697, 8699, 8701, 8703, 8705, 8707, 8709, 8711, 8713, 8715, 8717, 8719, 8721, 8723, 8725, 8727, 8729, 8731,

8733, 8735, 8737, 8739, 8741, 8743, 8745, 8747, 8749, 8751, 8753, 8755, 8757, 8759, 8761, 8763, 8765, 8767, 8769, 8771, 8773, 8775, 8777, 8779, 8781, 8783, 8785, 8787, 8789, 8791, 8793, 8795, 8797, 8799, 8801, 8803, 8805, 8807, 8809, 8811, 8813, 8815, 8817, 8819, 8821, 8823, 8825, 8827, 8829, 8831, 8833, 8835, 8837, 8839, 8841, 8843, 8845, 8847, 8849, 8851, 8853, 8855, 8857, 8859, 8861, 8863, 8865, 8867, 8869, 8871, 8873, 8875, 8877, 8879, 8881, 8883, 8885, 8887, 8889, 8891, 8893, 8895, 8897, 8899, 8901, 8903, 8905, 8907, 8909, 8911, 8913, 8915, 8917, 8919, 8921, 8923, 8925, 8927, 8929, 8931, 8933, 8935, 8937, 8939, 8941, 8943, 8945, 8947, 8949, 8951, 8953, 8955, 8957, 8959, 8961, 8963, 8965, 8967, 8969, 8971, 8973, 8975, 8977, 8979, 8981, 8983, 8985, 8987, 8989, 8991, 8993, 8995, 8997, 8999, 9001, 9003, 9005, 9007, 9009, 9011, 9013, 9015, 9017, 9019, 9021, 9023, 9025, 9027, 9029, 9031, 9033, 9035, 9037, 9039, 9041, 9043, 9045, 9047, 9049, 9051, 9053, 9055, 9057, 9059, 9061, 9063, 9065, 9067, 9069, 9071, 9073, 9075, 9077, 9079, 9081, 9083, 9085, 9087, 9089, 9091, 9093, 9095, 9097, 9099, 9101, 9103, 9105, 9107, 9109, 9111, 9113, 9115, 9117, 9119, 9121, 9123, 9125, 9127, 9129, 9131, 9133, 9135, 9137, 9139, 9141, 9143, 9145, 9147, 9149, 9151, 9153, 9155, 9157, 9159, 9161, 9163, 9165, 9167, 9169, 9171, 9173, 9175, 9177, 9179, 9181, 9183, 9185, 9187, 9189, 9191, 9193, 9195, 9197, 9199, 9201, 9203, 9205, 9207, 9209, 9211, 9213, 9215, 9217, 9219, 9221, 9223, 9225, 9227, 9229, 9231, 9233, 9235, 9237, 9239, 9241, 9243, 9245, 9247, 9249, 9251, 9253, 9255, 9257, 9259, 9261, 9263, 9265, 9267, 9269, 9271, 9273, 9275, 9277, 9279, 9281, 9283, 9285, 9287, 9289, 9291, 9293, 9295, 9297, 9299, 9301, 9303, 9305, 9307, 9309, 9311, 9313, 9315, 9317, 9319, 9321, 9323, 9325, 9327, 9329, 9331, 9333, 9335, 9337, 9339, 9341, 9343, 9345, 9347, 9349, 9351, 9353, 9355, 9357, 9359, 9361, 9363, 9365, 9367, 9369, 9371, 9373, 9375, 9377, 9379, 9381, 9383, 9385, 9387, 9389, 9391, 9393, 9395, 9397, 9399, 9401, 9403, 9405, 9407, 9409, 9411, 9413, 9415, 9417, 9419, 9421, 9423, 9425, 9427, 9429, 9431, 9433, 9435, 9437, 9439, 9441, 9443, 9445, 9447, 9449, 9451, 9453, 9455, 9457, 9459, 9461, 9463, 9465, 9467, 9469, 9471, 9473, 9475, 9477, 9479, 9481, 9483, 9485, 9487, 9489, 9491, 9493, 9495, 9497, 9499, 9501, 9503, 9505, 9507, 9509, 9511, 9513, 9515, 9517, 9519, 9521, 9523, 9525, 9527, 9529, 9531, 9533, 9535, 9537, 9539, 9541, 9543, 9545, 9547, 9549, 9551, 9553, 9555, 9557, 9559, 9561, 9563, 9565, 9567, 9569, 9571, 9573, 9575, 9577, 9579, 9581, 9583, 9585, 9587, 9589, 9591, 9593, 9595, 9597, 9599, 9601, 9603, 9605, 9607, 9609, 9611, 9613, 9615, 9617, 9619, 9621, 9623, 9625, 9627, 9629, 9631, 9633, 9635, 9637, 9639, 9641, 9643, 9645, 9647, 9649, 9651, 9653, 9655, 9657, 9659, 9661, 9663, 9665, 9667, 9669, 9671, 9673, 9675, 9677, 9679, 9681, 9683, 9685, 9687, 9689, 9691, 9693, 9695, 9697, 9699, 9701, 9703, 9705, 9707, 9709, 9711, 9713, 9715, 9717, 9719, 9721, 9723, 9725, 9727, 9729, 9731, 9733, 9735, 9737, 9739, 9741, 9743, 9745, 9747, 9749, 9751, 9753, 9755, 9757, 9759, 9761, 9763, 9765, 9767, 9769, 9771, 9773, 9775, 9777, 9779, 9781, 9783, 9785, 9787, 9789, 9791, 9793, 9795, 9797, 9799, 9801, 9803, 9805, 9807, 9809, 9811, 9813, 9815, 9817, 9819, 9821, 9823, 9825, 9827, 9829, 9831, 9833, 9835, 9837, 9839, 9841, 9843, 9845, 9847, 9849, 9851, 9853, 9855, 9857, 9859, 9861, 9863, 9865, 9867, 9869, 9871, 9873, 9875, 9877, 9879, 9881, 9883, 9885, 9887, 9889, 9891, 9893, 9895, 9897, 9899, 9901, 9903, 9905, 9907, 9909, 9911, 9913, 9915, 9917, 9919, 9921, 9923, 9925, 9927, 9929, 9931, 9933, 9935, 9937, 9939, 9941, 9943, 9945, 9947, 9949, 9951, 9953, 9955, 9957, 9959, 9961, 9963, 9965, 9967, 9969, 9971, 9973, 9975, 9977, 9979, 9981, 9983, 9985, 9987, 9989, 9991, 9993, 9995, 9997, 9999]

Output

Private Test case

Input 1

| | |
|---|-----------------|
| 1 | [1,1,1,1,1,1,1] |
| 2 | [1,1,1,1,1,1,1] |

Output

| | |
|---|-----|
| 1 | 1.0 |
|---|-----|

Input 2

1 [0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580,

1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606,
1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632,
1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658,
1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684,
1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710,
1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736,
1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762,
1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788,
1790, 1792, 1794, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1812, 1814,
1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840,
1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866,
1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892,
1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918,
1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944,
1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970,
1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996,
1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022,
2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048,
2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 2074,
2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100,
2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126,
2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152,
2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178,
2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204,
2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230,
2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256,
2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282,
2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308,
2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334,
2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360,
2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386,
2388, 2390, 2392, 2394, 2396, 2398, 2400, 2402, 2404, 2406, 2408, 2410, 2412,
2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438,
2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464,
2466, 2468, 2470, 2472, 2474, 2476, 2478, 2480, 2482, 2484, 2486, 2488, 2490,
2492, 2494, 2496, 2498, 2500, 2502, 2504, 2506, 2508, 2510, 2512, 2514, 2516,
2518, 2520, 2522, 2524, 2526, 2528, 2530, 2532, 2534, 2536, 2538, 2540, 2542,
2544, 2546, 2548, 2550, 2552, 2554, 2556, 2558, 2560, 2562, 2564, 2566, 2568,
2570, 2572, 2574, 2576, 2578, 2580, 2582, 2584, 2586, 2588, 2590, 2592, 2594,
2596, 2598, 2600, 2602, 2604, 2606, 2608, 2610, 2612, 2614, 2616, 2618, 2620,
2622, 2624, 2626, 2628, 2630, 2632, 2634, 2636, 2638, 2640, 2642, 2644, 2646,
2648, 2650, 2652, 2654, 2656, 2658, 2660, 2662, 2664, 2666, 2668, 2670, 2672,
2674, 2676, 2678, 2680, 2682, 2684, 2686, 2688, 2690, 2692, 2694, 2696, 2698,
2700, 2702, 2704, 2706, 2708, 2710, 2712, 2714, 2716, 2718, 2720, 2722, 2724,
2726, 2728, 2730, 2732, 2734, 2736, 2738, 2740, 2742, 2744, 2746, 2748, 2750,
2752, 2754, 2756, 2758, 2760, 2762, 2764, 2766, 2768, 2770, 2772, 2774, 2776,
2778, 2780, 2782, 2784, 2786, 2788, 2790, 2792, 2794, 2796, 2798, 2800, 2802,
2804, 2806, 2808, 2810, 2812, 2814, 2816, 2818, 2820, 2822, 2824, 2826, 2828,
2830, 2832, 2834, 2836, 2838, 2840, 2842, 2844, 2846, 2848, 2850, 2852, 2854,
2856, 2858, 2860, 2862, 2864, 2866, 2868, 2870, 2872, 2874, 2876, 2878, 2880,
2882, 2884, 2886, 2888, 2890, 2892, 2894, 2896, 2898, 2900, 2902, 2904, 2906,
2908, 2910, 2912, 2914, 2916, 2918, 2920, 2922, 2924, 2926, 2928, 2930, 2932,
2934, 2936, 2938, 2940, 2942, 2944, 2946, 2948, 2950, 2952, 2954, 2956, 2958,
2960, 2962, 2964, 2966, 2968, 2970, 2972, 2974, 2976, 2978, 2980, 2982, 2984,
2986, 2988, 2990, 2992, 2994, 2996, 2998, 3000, 3002, 3004, 3006, 3008, 3010,

3012, 3014, 3016, 3018, 3020, 3022, 3024, 3026, 3028, 3030, 3032, 3034, 3036,
3038, 3040, 3042, 3044, 3046, 3048, 3050, 3052, 3054, 3056, 3058, 3060, 3062,
3064, 3066, 3068, 3070, 3072, 3074, 3076, 3078, 3080, 3082, 3084, 3086, 3088,
3090, 3092, 3094, 3096, 3098, 3100, 3102, 3104, 3106, 3108, 3110, 3112, 3114,
3116, 3118, 3120, 3122, 3124, 3126, 3128, 3130, 3132, 3134, 3136, 3138, 3140,
3142, 3144, 3146, 3148, 3150, 3152, 3154, 3156, 3158, 3160, 3162, 3164, 3166,
3168, 3170, 3172, 3174, 3176, 3178, 3180, 3182, 3184, 3186, 3188, 3190, 3192,
3194, 3196, 3198, 3200, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218,
3220, 3222, 3224, 3226, 3228, 3230, 3232, 3234, 3236, 3238, 3240, 3242, 3244,
3246, 3248, 3250, 3252, 3254, 3256, 3258, 3260, 3262, 3264, 3266, 3268, 3270,
3272, 3274, 3276, 3278, 3280, 3282, 3284, 3286, 3288, 3290, 3292, 3294, 3296,
3298, 3300, 3302, 3304, 3306, 3308, 3310, 3312, 3314, 3316, 3318, 3320, 3322,
3324, 3326, 3328, 3330, 3332, 3334, 3336, 3338, 3340, 3342, 3344, 3346, 3348,
3350, 3352, 3354, 3356, 3358, 3360, 3362, 3364, 3366, 3368, 3370, 3372, 3374,
3376, 3378, 3380, 3382, 3384, 3386, 3388, 3390, 3392, 3394, 3396, 3398, 3400,
3402, 3404, 3406, 3408, 3410, 3412, 3414, 3416, 3418, 3420, 3422, 3424, 3426,
3428, 3430, 3432, 3434, 3436, 3438, 3440, 3442, 3444, 3446, 3448, 3450, 3452,
3454, 3456, 3458, 3460, 3462, 3464, 3466, 3468, 3470, 3472, 3474, 3476, 3478,
3480, 3482, 3484, 3486, 3488, 3490, 3492, 3494, 3496, 3498, 3500, 3502, 3504,
3506, 3508, 3510, 3512, 3514, 3516, 3518, 3520, 3522, 3524, 3526, 3528, 3530,
3532, 3534, 3536, 3538, 3540, 3542, 3544, 3546, 3548, 3550, 3552, 3554, 3556,
3558, 3560, 3562, 3564, 3566, 3568, 3570, 3572, 3574, 3576, 3578, 3580, 3582,
3584, 3586, 3588, 3590, 3592, 3594, 3596, 3598, 3600, 3602, 3604, 3606, 3608,
3610, 3612, 3614, 3616, 3618, 3620, 3622, 3624, 3626, 3628, 3630, 3632, 3634,
3636, 3638, 3640, 3642, 3644, 3646, 3648, 3650, 3652, 3654, 3656, 3658, 3660,
3662, 3664, 3666, 3668, 3670, 3672, 3674, 3676, 3678, 3680, 3682, 3684, 3686,
3688, 3690, 3692, 3694, 3696, 3698, 3700, 3702, 3704, 3706, 3708, 3710, 3712,
3714, 3716, 3718, 3720, 3722, 3724, 3726, 3728, 3730, 3732, 3734, 3736, 3738,
3740, 3742, 3744, 3746, 3748, 3750, 3752, 3754, 3756, 3758, 3760, 3762, 3764,
3766, 3768, 3770, 3772, 3774, 3776, 3778, 3780, 3782, 3784, 3786, 3788, 3790,
3792, 3794, 3796, 3798, 3800, 3802, 3804, 3806, 3808, 3810, 3812, 3814, 3816,
3818, 3820, 3822, 3824, 3826, 3828, 3830, 3832, 3834, 3836, 3838, 3840, 3842,
3844, 3846, 3848, 3850, 3852, 3854, 3856, 3858, 3860, 3862, 3864, 3866, 3868,
3870, 3872, 3874, 3876, 3878, 3880, 3882, 3884, 3886, 3888, 3890, 3892, 3894,
3896, 3898, 3900, 3902, 3904, 3906, 3908, 3910, 3912, 3914, 3916, 3918, 3920,
3922, 3924, 3926, 3928, 3930, 3932, 3934, 3936, 3938, 3940, 3942, 3944, 3946,
3948, 3950, 3952, 3954, 3956, 3958, 3960, 3962, 3964, 3966, 3968, 3970, 3972,
3974, 3976, 3978, 3980, 3982, 3984, 3986, 3988, 3990, 3992, 3994, 3996, 3998,
4000, 4002, 4004, 4006, 4008, 4010, 4012, 4014, 4016, 4018, 4020, 4022, 4024,
4026, 4028, 4030, 4032, 4034, 4036, 4038, 4040, 4042, 4044, 4046, 4048, 4050,
4052, 4054, 4056, 4058, 4060, 4062, 4064, 4066, 4068, 4070, 4072, 4074, 4076,
4078, 4080, 4082, 4084, 4086, 4088, 4090, 4092, 4094, 4096, 4098, 4100, 4102,
4104, 4106, 4108, 4110, 4112, 4114, 4116, 4118, 4120, 4122, 4124, 4126, 4128,
4130, 4132, 4134, 4136, 4138, 4140, 4142, 4144, 4146, 4148, 4150, 4152, 4154,
4156, 4158, 4160, 4162, 4164, 4166, 4168, 4170, 4172, 4174, 4176, 4178, 4180,
4182, 4184, 4186, 4188, 4190, 4192, 4194, 4196, 4198, 4200, 4202, 4204, 4206,
4208, 4210, 4212, 4214, 4216, 4218, 4220, 4222, 4224, 4226, 4228, 4230, 4232,
4234, 4236, 4238, 4240, 4242, 4244, 4246, 4248, 4250, 4252, 4254, 4256, 4258,
4260, 4262, 4264, 4266, 4268, 4270, 4272, 4274, 4276, 4278, 4280, 4282, 4284,
4286, 4288, 4290, 4292, 4294, 4296, 4298, 4300, 4302, 4304, 4306, 4308, 4310,
4312, 4314, 4316, 4318, 4320, 4322, 4324, 4326, 4328, 4330, 4332, 4334, 4336,
4338, 4340, 4342, 4344, 4346, 4348, 4350, 4352, 4354, 4356, 4358, 4360, 4362,
4364, 4366, 4368, 4370, 4372, 4374, 4376, 4378, 4380, 4382, 4384, 4386, 4388,
4390, 4392, 4394, 4396, 4398, 4400, 4402, 4404, 4406, 4408, 4410, 4412, 4414,
4416, 4418, 4420, 4422, 4424, 4426, 4428, 4430, 4432, 4434, 4436, 4438, 4440,

4442, 4444, 4446, 4448, 4450, 4452, 4454, 4456, 4458, 4460, 4462, 4464, 4466,
4468, 4470, 4472, 4474, 4476, 4478, 4480, 4482, 4484, 4486, 4488, 4490, 4492,
4494, 4496, 4498, 4500, 4502, 4504, 4506, 4508, 4510, 4512, 4514, 4516, 4518,
4520, 4522, 4524, 4526, 4528, 4530, 4532, 4534, 4536, 4538, 4540, 4542, 4544,
4546, 4548, 4550, 4552, 4554, 4556, 4558, 4560, 4562, 4564, 4566, 4568, 4570,
4572, 4574, 4576, 4578, 4580, 4582, 4584, 4586, 4588, 4590, 4592, 4594, 4596,
4598, 4600, 4602, 4604, 4606, 4608, 4610, 4612, 4614, 4616, 4618, 4620, 4622,
4624, 4626, 4628, 4630, 4632, 4634, 4636, 4638, 4640, 4642, 4644, 4646, 4648,
4650, 4652, 4654, 4656, 4658, 4660, 4662, 4664, 4666, 4668, 4670, 4672, 4674,
4676, 4678, 4680, 4682, 4684, 4686, 4688, 4690, 4692, 4694, 4696, 4698, 4700,
4702, 4704, 4706, 4708, 4710, 4712, 4714, 4716, 4718, 4720, 4722, 4724, 4726,
4728, 4730, 4732, 4734, 4736, 4738, 4740, 4742, 4744, 4746, 4748, 4750, 4752,
4754, 4756, 4758, 4760, 4762, 4764, 4766, 4768, 4770, 4772, 4774, 4776, 4778,
4780, 4782, 4784, 4786, 4788, 4790, 4792, 4794, 4796, 4798, 4800, 4802, 4804,
4806, 4808, 4810, 4812, 4814, 4816, 4818, 4820, 4822, 4824, 4826, 4828, 4830,
4832, 4834, 4836, 4838, 4840, 4842, 4844, 4846, 4848, 4850, 4852, 4854, 4856,
4858, 4860, 4862, 4864, 4866, 4868, 4870, 4872, 4874, 4876, 4878, 4880, 4882,
4884, 4886, 4888, 4890, 4892, 4894, 4896, 4898, 4900, 4902, 4904, 4906, 4908,
4910, 4912, 4914, 4916, 4918, 4920, 4922, 4924, 4926, 4928, 4930, 4932, 4934,
4936, 4938, 4940, 4942, 4944, 4946, 4948, 4950, 4952, 4954, 4956, 4958, 4960,
4962, 4964, 4966, 4968, 4970, 4972, 4974, 4976, 4978, 4980, 4982, 4984, 4986,
4988, 4990, 4992, 4994, 4996, 4998, 5000, 5002, 5004, 5006, 5008, 5010, 5012,
5014, 5016, 5018, 5020, 5022, 5024, 5026, 5028, 5030, 5032, 5034, 5036, 5038,
5040, 5042, 5044, 5046, 5048, 5050, 5052, 5054, 5056, 5058, 5060, 5062, 5064,
5066, 5068, 5070, 5072, 5074, 5076, 5078, 5080, 5082, 5084, 5086, 5088, 5090,
5092, 5094, 5096, 5098, 5100, 5102, 5104, 5106, 5108, 5110, 5112, 5114, 5116,
5118, 5120, 5122, 5124, 5126, 5128, 5130, 5132, 5134, 5136, 5138, 5140, 5142,
5144, 5146, 5148, 5150, 5152, 5154, 5156, 5158, 5160, 5162, 5164, 5166, 5168,
5170, 5172, 5174, 5176, 5178, 5180, 5182, 5184, 5186, 5188, 5190, 5192, 5194,
5196, 5198, 5200, 5202, 5204, 5206, 5208, 5210, 5212, 5214, 5216, 5218, 5220,
5222, 5224, 5226, 5228, 5230, 5232, 5234, 5236, 5238, 5240, 5242, 5244, 5246,
5248, 5250, 5252, 5254, 5256, 5258, 5260, 5262, 5264, 5266, 5268, 5270, 5272,
5274, 5276, 5278, 5280, 5282, 5284, 5286, 5288, 5290, 5292, 5294, 5296, 5298,
5300, 5302, 5304, 5306, 5308, 5310, 5312, 5314, 5316, 5318, 5320, 5322, 5324,
5326, 5328, 5330, 5332, 5334, 5336, 5338, 5340, 5342, 5344, 5346, 5348, 5350,
5352, 5354, 5356, 5358, 5360, 5362, 5364, 5366, 5368, 5370, 5372, 5374, 5376,
5378, 5380, 5382, 5384, 5386, 5388, 5390, 5392, 5394, 5396, 5398, 5400, 5402,
5404, 5406, 5408, 5410, 5412, 5414, 5416, 5418, 5420, 5422, 5424, 5426, 5428,
5430, 5432, 5434, 5436, 5438, 5440, 5442, 5444, 5446, 5448, 5450, 5452, 5454,
5456, 5458, 5460, 5462, 5464, 5466, 5468, 5470, 5472, 5474, 5476, 5478, 5480,
5482, 5484, 5486, 5488, 5490, 5492, 5494, 5496, 5498, 5500, 5502, 5504, 5506,
5508, 5510, 5512, 5514, 5516, 5518, 5520, 5522, 5524, 5526, 5528, 5530, 5532,
5534, 5536, 5538, 5540, 5542, 5544, 5546, 5548, 5550, 5552, 5554, 5556, 5558,
5560, 5562, 5564, 5566, 5568, 5570, 5572, 5574, 5576, 5578, 5580, 5582, 5584,
5586, 5588, 5590, 5592, 5594, 5596, 5598, 5600, 5602, 5604, 5606, 5608, 5610,
5612, 5614, 5616, 5618, 5620, 5622, 5624, 5626, 5628, 5630, 5632, 5634, 5636,
5638, 5640, 5642, 5644, 5646, 5648, 5650, 5652, 5654, 5656, 5658, 5660, 5662,
5664, 5666, 5668, 5670, 5672, 5674, 5676, 5678, 5680, 5682, 5684, 5686, 5688,
5690, 5692, 5694, 5696, 5698, 5700, 5702, 5704, 5706, 5708, 5710, 5712, 5714,
5716, 5718, 5720, 5722, 5724, 5726, 5728, 5730, 5732, 5734, 5736, 5738, 5740,
5742, 5744, 5746, 5748, 5750, 5752, 5754, 5756, 5758, 5760, 5762, 5764, 5766,
5768, 5770, 5772, 5774, 5776, 5778, 5780, 5782, 5784, 5786, 5788, 5790, 5792,
5794, 5796, 5798, 5800, 5802, 5804, 5806, 5808, 5810, 5812, 5814, 5816, 5818,
5820, 5822, 5824, 5826, 5828, 5830, 5832, 5834, 5836, 5838, 5840, 5842, 5844,
5846, 5848, 5850, 5852, 5854, 5856, 5858, 5860, 5862, 5864, 5866, 5868, 5870,

5872, 5874, 5876, 5878, 5880, 5882, 5884, 5886, 5888, 5890, 5892, 5894, 5896,
5898, 5900, 5902, 5904, 5906, 5908, 5910, 5912, 5914, 5916, 5918, 5920, 5922,
5924, 5926, 5928, 5930, 5932, 5934, 5936, 5938, 5940, 5942, 5944, 5946, 5948,
5950, 5952, 5954, 5956, 5958, 5960, 5962, 5964, 5966, 5968, 5970, 5972, 5974,
5976, 5978, 5980, 5982, 5984, 5986, 5988, 5990, 5992, 5994, 5996, 5998, 6000,
6002, 6004, 6006, 6008, 6010, 6012, 6014, 6016, 6018, 6020, 6022, 6024, 6026,
6028, 6030, 6032, 6034, 6036, 6038, 6040, 6042, 6044, 6046, 6048, 6050, 6052,
6054, 6056, 6058, 6060, 6062, 6064, 6066, 6068, 6070, 6072, 6074, 6076, 6078,
6080, 6082, 6084, 6086, 6088, 6090, 6092, 6094, 6096, 6098, 6100, 6102, 6104,
6106, 6108, 6110, 6112, 6114, 6116, 6118, 6120, 6122, 6124, 6126, 6128, 6130,
6132, 6134, 6136, 6138, 6140, 6142, 6144, 6146, 6148, 6150, 6152, 6154, 6156,
6158, 6160, 6162, 6164, 6166, 6168, 6170, 6172, 6174, 6176, 6178, 6180, 6182,
6184, 6186, 6188, 6190, 6192, 6194, 6196, 6198, 6200, 6202, 6204, 6206, 6208,
6210, 6212, 6214, 6216, 6218, 6220, 6222, 6224, 6226, 6228, 6230, 6232, 6234,
6236, 6238, 6240, 6242, 6244, 6246, 6248, 6250, 6252, 6254, 6256, 6258, 6260,
6262, 6264, 6266, 6268, 6270, 6272, 6274, 6276, 6278, 6280, 6282, 6284, 6286,
6288, 6290, 6292, 6294, 6296, 6298, 6300, 6302, 6304, 6306, 6308, 6310, 6312,
6314, 6316, 6318, 6320, 6322, 6324, 6326, 6328, 6330, 6332, 6334, 6336, 6338,
6340, 6342, 6344, 6346, 6348, 6350, 6352, 6354, 6356, 6358, 6360, 6362, 6364,
6366, 6368, 6370, 6372, 6374, 6376, 6378, 6380, 6382, 6384, 6386, 6388, 6390,
6392, 6394, 6396, 6398, 6400, 6402, 6404, 6406, 6408, 6410, 6412, 6414, 6416,
6418, 6420, 6422, 6424, 6426, 6428, 6430, 6432, 6434, 6436, 6438, 6440, 6442,
6444, 6446, 6448, 6450, 6452, 6454, 6456, 6458, 6460, 6462, 6464, 6466, 6468,
6470, 6472, 6474, 6476, 6478, 6480, 6482, 6484, 6486, 6488, 6490, 6492, 6494,
6496, 6498, 6500, 6502, 6504, 6506, 6508, 6510, 6512, 6514, 6516, 6518, 6520,
6522, 6524, 6526, 6528, 6530, 6532, 6534, 6536, 6538, 6540, 6542, 6544, 6546,
6548, 6550, 6552, 6554, 6556, 6558, 6560, 6562, 6564, 6566, 6568, 6570, 6572,
6574, 6576, 6578, 6580, 6582, 6584, 6586, 6588, 6590, 6592, 6594, 6596, 6598,
6600, 6602, 6604, 6606, 6608, 6610, 6612, 6614, 6616, 6618, 6620, 6622, 6624,
6626, 6628, 6630, 6632, 6634, 6636, 6638, 6640, 6642, 6644, 6646, 6648, 6650,
6652, 6654, 6656, 6658, 6660, 6662, 6664, 6666, 6668, 6670, 6672, 6674, 6676,
6678, 6680, 6682, 6684, 6686, 6688, 6690, 6692, 6694, 6696, 6698, 6700, 6702,
6704, 6706, 6708, 6710, 6712, 6714, 6716, 6718, 6720, 6722, 6724, 6726, 6728,
6730, 6732, 6734, 6736, 6738, 6740, 6742, 6744, 6746, 6748, 6750, 6752, 6754,
6756, 6758, 6760, 6762, 6764, 6766, 6768, 6770, 6772, 6774, 6776, 6778, 6780,
6782, 6784, 6786, 6788, 6790, 6792, 6794, 6796, 6798, 6800, 6802, 6804, 6806,
6808, 6810, 6812, 6814, 6816, 6818, 6820, 6822, 6824, 6826, 6828, 6830, 6832,
6834, 6836, 6838, 6840, 6842, 6844, 6846, 6848, 6850, 6852, 6854, 6856, 6858,
6860, 6862, 6864, 6866, 6868, 6870, 6872, 6874, 6876, 6878, 6880, 6882, 6884,
6886, 6888, 6890, 6892, 6894, 6896, 6898, 6900, 6902, 6904, 6906, 6908, 6910,
6912, 6914, 6916, 6918, 6920, 6922, 6924, 6926, 6928, 6930, 6932, 6934, 6936,
6938, 6940, 6942, 6944, 6946, 6948, 6950, 6952, 6954, 6956, 6958, 6960, 6962,
6964, 6966, 6968, 6970, 6972, 6974, 6976, 6978, 6980, 6982, 6984, 6986, 6988,
6990, 6992, 6994, 6996, 6998, 7000, 7002, 7004, 7006, 7008, 7010, 7012, 7014,
7016, 7018, 7020, 7022, 7024, 7026, 7028, 7030, 7032, 7034, 7036, 7038, 7040,
7042, 7044, 7046, 7048, 7050, 7052, 7054, 7056, 7058, 7060, 7062, 7064, 7066,
7068, 7070, 7072, 7074, 7076, 7078, 7080, 7082, 7084, 7086, 7088, 7090, 7092,
7094, 7096, 7098, 7100, 7102, 7104, 7106, 7108, 7110, 7112, 7114, 7116, 7118,
7120, 7122, 7124, 7126, 7128, 7130, 7132, 7134, 7136, 7138, 7140, 7142, 7144,
7146, 7148, 7150, 7152, 7154, 7156, 7158, 7160, 7162, 7164, 7166, 7168, 7170,
7172, 7174, 7176, 7178, 7180, 7182, 7184, 7186, 7188, 7190, 7192, 7194, 7196,
7198, 7200, 7202, 7204, 7206, 7208, 7210, 7212, 7214, 7216, 7218, 7220, 7222,
7224, 7226, 7228, 7230, 7232, 7234, 7236, 7238, 7240, 7242, 7244, 7246, 7248,
7250, 7252, 7254, 7256, 7258, 7260, 7262, 7264, 7266, 7268, 7270, 7272, 7274,
7276, 7278, 7280, 7282, 7284, 7286, 7288, 7290, 7292, 7294, 7296, 7298, 7300,

7302, 7304, 7306, 7308, 7310, 7312, 7314, 7316, 7318, 7320, 7322, 7324, 7326, 7328, 7330, 7332, 7334, 7336, 7338, 7340, 7342, 7344, 7346, 7348, 7350, 7352, 7354, 7356, 7358, 7360, 7362, 7364, 7366, 7368, 7370, 7372, 7374, 7376, 7378, 7380, 7382, 7384, 7386, 7388, 7390, 7392, 7394, 7396, 7398, 7400, 7402, 7404, 7406, 7408, 7410, 7412, 7414, 7416, 7418, 7420, 7422, 7424, 7426, 7428, 7430, 7432, 7434, 7436, 7438, 7440, 7442, 7444, 7446, 7448, 7450, 7452, 7454, 7456, 7458, 7460, 7462, 7464, 7466, 7468, 7470, 7472, 7474, 7476, 7478, 7480, 7482, 7484, 7486, 7488, 7490, 7492, 7494, 7496, 7498, 7500, 7502, 7504, 7506, 7508, 7510, 7512, 7514, 7516, 7518, 7520, 7522, 7524, 7526, 7528, 7530, 7532, 7534, 7536, 7538, 7540, 7542, 7544, 7546, 7548, 7550, 7552, 7554, 7556, 7558, 7560, 7562, 7564, 7566, 7568, 7570, 7572, 7574, 7576, 7578, 7580, 7582, 7584, 7586, 7588, 7590, 7592, 7594, 7596, 7598, 7600, 7602, 7604, 7606, 7608, 7610, 7612, 7614, 7616, 7618, 7620, 7622, 7624, 7626, 7628, 7630, 7632, 7634, 7636, 7638, 7640, 7642, 7644, 7646, 7648, 7650, 7652, 7654, 7656, 7658, 7660, 7662, 7664, 7666, 7668, 7670, 7672, 7674, 7676, 7678, 7680, 7682, 7684, 7686, 7688, 7690, 7692, 7694, 7696, 7698, 7700, 7702, 7704, 7706, 7708, 7710, 7712, 7714, 7716, 7718, 7720, 7722, 7724, 7726, 7728, 7730, 7732, 7734, 7736, 7738, 7740, 7742, 7744, 7746, 7748, 7750, 7752, 7754, 7756, 7758, 7760, 7762, 7764, 7766, 7768, 7770, 7772, 7774, 7776, 7778, 7780, 7782, 7784, 7786, 7788, 7790, 7792, 7794, 7796, 7798, 7800, 7802, 7804, 7806, 7808, 7810, 7812, 7814, 7816, 7818, 7820, 7822, 7824, 7826, 7828, 7830, 7832, 7834, 7836, 7838, 7840, 7842, 7844, 7846, 7848, 7850, 7852, 7854, 7856, 7858, 7860, 7862, 7864, 7866, 7868, 7870, 7872, 7874, 7876, 7878, 7880, 7882, 7884, 7886, 7888, 7890, 7892, 7894, 7896, 7898, 7900, 7902, 7904, 7906, 7908, 7910, 7912, 7914, 7916, 7918, 7920, 7922, 7924, 7926, 7928, 7930, 7932, 7934, 7936, 7938, 7940, 7942, 7944, 7946, 7948, 7950, 7952, 7954, 7956, 7958, 7960, 7962, 7964, 7966, 7968, 7970, 7972, 7974, 7976, 7978, 7980, 7982, 7984, 7986, 7988, 7990, 7992, 7994, 7996, 7998, 8000, 8002, 8004, 8006, 8008, 8010, 8012, 8014, 8016, 8018, 8020, 8022, 8024, 8026, 8028, 8030, 8032, 8034, 8036, 8038, 8040, 8042, 8044, 8046, 8048, 8050, 8052, 8054, 8056, 8058, 8060, 8062, 8064, 8066, 8068, 8070, 8072, 8074, 8076, 8078, 8080, 8082, 8084, 8086, 8088, 8090, 8092, 8094, 8096, 8098, 8100, 8102, 8104, 8106, 8108, 8110, 8112, 8114, 8116, 8118, 8120, 8122, 8124, 8126, 8128, 8130, 8132, 8134, 8136, 8138, 8140, 8142, 8144, 8146, 8148, 8150, 8152, 8154, 8156, 8158, 8160, 8162, 8164, 8166, 8168, 8170, 8172, 8174, 8176, 8178, 8180, 8182, 8184, 8186, 8188, 8190, 8192, 8194, 8196, 8198, 8200, 8202, 8204, 8206, 8208, 8210, 8212, 8214, 8216, 8218, 8220, 8222, 8224, 8226, 8228, 8230, 8232, 8234, 8236, 8238, 8240, 8242, 8244, 8246, 8248, 8250, 8252, 8254, 8256, 8258, 8260, 8262, 8264, 8266, 8268, 8270, 8272, 8274, 8276, 8278, 8280, 8282, 8284, 8286, 8288, 8290, 8292, 8294, 8296, 8298, 8300, 8302, 8304, 8306, 8308, 8310, 8312, 8314, 8316, 8318, 8320, 8322, 8324, 8326, 8328, 8330, 8332, 8334, 8336, 8338, 8340, 8342, 8344, 8346, 8348, 8350, 8352, 8354, 8356, 8358, 8360, 8362, 8364, 8366, 8368, 8370, 8372, 8374, 8376, 8378, 8380, 8382, 8384, 8386, 8388, 8390, 8392, 8394, 8396, 8398, 8400, 8402, 8404, 8406, 8408, 8410, 8412, 8414, 8416, 8418, 8420, 8422, 8424, 8426, 8428, 8430, 8432, 8434, 8436, 8438, 8440, 8442, 8444, 8446, 8448, 8450, 8452, 8454, 8456, 8458, 8460, 8462, 8464, 8466, 8468, 8470, 8472, 8474, 8476, 8478, 8480, 8482, 8484, 8486, 8488, 8490, 8492, 8494, 8496, 8498, 8500, 8502, 8504, 8506, 8508, 8510, 8512, 8514, 8516, 8518, 8520, 8522, 8524, 8526, 8528, 8530, 8532, 8534, 8536, 8538, 8540, 8542, 8544, 8546, 8548, 8550, 8552, 8554, 8556, 8558, 8560, 8562, 8564, 8566, 8568, 8570, 8572, 8574, 8576, 8578, 8580, 8582, 8584, 8586, 8588, 8590, 8592, 8594, 8596, 8598, 8600, 8602, 8604, 8606, 8608, 8610, 8612, 8614, 8616, 8618, 8620, 8622, 8624, 8626, 8628, 8630, 8632, 8634, 8636, 8638, 8640, 8642, 8644, 8646, 8648, 8650, 8652, 8654, 8656, 8658, 8660, 8662, 8664, 8666, 8668, 8670, 8672, 8674, 8676, 8678, 8680, 8682, 8684, 8686, 8688, 8690, 8692, 8694, 8696, 8698, 8700, 8702, 8704, 8706, 8708, 8710, 8712, 8714, 8716, 8718, 8720, 8722, 8724, 8726, 8728, 8730,

8732, 8734, 8736, 8738, 8740, 8742, 8744, 8746, 8748, 8750, 8752, 8754, 8756,
8758, 8760, 8762, 8764, 8766, 8768, 8770, 8772, 8774, 8776, 8778, 8780, 8782,
8784, 8786, 8788, 8790, 8792, 8794, 8796, 8798, 8800, 8802, 8804, 8806, 8808,
8810, 8812, 8814, 8816, 8818, 8820, 8822, 8824, 8826, 8828, 8830, 8832, 8834,
8836, 8838, 8840, 8842, 8844, 8846, 8848, 8850, 8852, 8854, 8856, 8858, 8860,
8862, 8864, 8866, 8868, 8870, 8872, 8874, 8876, 8878, 8880, 8882, 8884, 8886,
8888, 8890, 8892, 8894, 8896, 8898, 8900, 8902, 8904, 8906, 8908, 8910, 8912,
8914, 8916, 8918, 8920, 8922, 8924, 8926, 8928, 8930, 8932, 8934, 8936, 8938,
8940, 8942, 8944, 8946, 8948, 8950, 8952, 8954, 8956, 8958, 8960, 8962, 8964,
8966, 8968, 8970, 8972, 8974, 8976, 8978, 8980, 8982, 8984, 8986, 8988, 8990,
8992, 8994, 8996, 8998, 9000, 9002, 9004, 9006, 9008, 9010, 9012, 9014, 9016,
9018, 9020, 9022, 9024, 9026, 9028, 9030, 9032, 9034, 9036, 9038, 9040, 9042,
9044, 9046, 9048, 9050, 9052, 9054, 9056, 9058, 9060, 9062, 9064, 9066, 9068,
9070, 9072, 9074, 9076, 9078, 9080, 9082, 9084, 9086, 9088, 9090, 9092, 9094,
9096, 9098, 9100, 9102, 9104, 9106, 9108, 9110, 9112, 9114, 9116, 9118, 9120,
9122, 9124, 9126, 9128, 9130, 9132, 9134, 9136, 9138, 9140, 9142, 9144, 9146,
9148, 9150, 9152, 9154, 9156, 9158, 9160, 9162, 9164, 9166, 9168, 9170, 9172,
9174, 9176, 9178, 9180, 9182, 9184, 9186, 9188, 9190, 9192, 9194, 9196, 9198,
9200, 9202, 9204, 9206, 9208, 9210, 9212, 9214, 9216, 9218, 9220, 9222, 9224,
9226, 9228, 9230, 9232, 9234, 9236, 9238, 9240, 9242, 9244, 9246, 9248, 9250,
9252, 9254, 9256, 9258, 9260, 9262, 9264, 9266, 9268, 9270, 9272, 9274, 9276,
9278, 9280, 9282, 9284, 9286, 9288, 9290, 9292, 9294, 9296, 9298, 9300, 9302,
9304, 9306, 9308, 9310, 9312, 9314, 9316, 9318, 9320, 9322, 9324, 9326, 9328,
9330, 9332, 9334, 9336, 9338, 9340, 9342, 9344, 9346, 9348, 9350, 9352, 9354,
9356, 9358, 9360, 9362, 9364, 9366, 9368, 9370, 9372, 9374, 9376, 9378, 9380,
9382, 9384, 9386, 9388, 9390, 9392, 9394, 9396, 9398, 9400, 9402, 9404, 9406,
9408, 9410, 9412, 9414, 9416, 9418, 9420, 9422, 9424, 9426, 9428, 9430, 9432,
9434, 9436, 9438, 9440, 9442, 9444, 9446, 9448, 9450, 9452, 9454, 9456, 9458,
9460, 9462, 9464, 9466, 9468, 9470, 9472, 9474, 9476, 9478, 9480, 9482, 9484,
9486, 9488, 9490, 9492, 9494, 9496, 9498, 9500, 9502, 9504, 9506, 9508, 9510,
9512, 9514, 9516, 9518, 9520, 9522, 9524, 9526, 9528, 9530, 9532, 9534, 9536,
9538, 9540, 9542, 9544, 9546, 9548, 9550, 9552, 9554, 9556, 9558, 9560, 9562,
9564, 9566, 9568, 9570, 9572, 9574, 9576, 9578, 9580, 9582, 9584, 9586, 9588,
9590, 9592, 9594, 9596, 9598, 9600, 9602, 9604, 9606, 9608, 9610, 9612, 9614,
9616, 9618, 9620, 9622, 9624, 9626, 9628, 9630, 9632, 9634, 9636, 9638, 9640,
9642, 9644, 9646, 9648, 9650, 9652, 9654, 9656, 9658, 9660, 9662, 9664, 9666,
9668, 9670, 9672, 9674, 9676, 9678, 9680, 9682, 9684, 9686, 9688, 9690, 9692,
9694, 9696, 9698, 9700, 9702, 9704, 9706, 9708, 9710, 9712, 9714, 9716, 9718,
9720, 9722, 9724, 9726, 9728, 9730, 9732, 9734, 9736, 9738, 9740, 9742, 9744,
9746, 9748, 9750, 9752, 9754, 9756, 9758, 9760, 9762, 9764, 9766, 9768, 9770,
9772, 9774, 9776, 9778, 9780, 9782, 9784, 9786, 9788, 9790, 9792, 9794, 9796,
9798, 9800, 9802, 9804, 9806, 9808, 9810, 9812, 9814, 9816, 9818, 9820, 9822,
9824, 9826, 9828, 9830, 9832, 9834, 9836, 9838, 9840, 9842, 9844, 9846, 9848,
9850, 9852, 9854, 9856, 9858, 9860, 9862, 9864, 9866, 9868, 9870, 9872, 9874,
9876, 9878, 9880, 9882, 9884, 9886, 9888, 9890, 9892, 9894, 9896, 9898, 9900,
9902, 9904, 9906, 9908, 9910, 9912, 9914, 9916, 9918, 9920, 9922, 9924, 9926,
9928, 9930, 9932, 9934, 9936, 9938, 9940, 9942, 9944, 9946, 9948, 9950, 9952,
9954, 9956, 9958, 9960, 9962, 9964, 9966, 9968, 9970, 9972, 9974, 9976, 9978,
9980, 9982, 9984, 9986, 9988, 9990, 9992, 9994, 9996, 9998]

[1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581,

1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607,
1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633,
1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659,
1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685,
1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711,
1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737,
1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763,
1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789,
1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815,
1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841,
1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867,
1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893,
1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919,
1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945,
1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971,
1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997,
1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023,
2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049,
2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075,
2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101,
2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127,
2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153,
2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179,
2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205,
2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231,
2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257,
2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283,
2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309,
2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335,
2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361,
2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387,
2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413,
2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439,
2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465,
2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491,
2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517,
2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543,
2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569,
2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595,
2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621,
2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647,
2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673,
2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699,
2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725,
2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751,
2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777,
2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803,
2805, 2807, 2809, 2811, 2813, 2815, 2817, 2819, 2821, 2823, 2825, 2827, 2829,
2831, 2833, 2835, 2837, 2839, 2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855,
2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881,
2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907,
2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933,
2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959,
2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985,
2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011,

3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037,
3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063,
3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089,
3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115,
3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141,
3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167,
3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193,
3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219,
3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245,
3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271,
3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297,
3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323,
3325, 3327, 3329, 3331, 3333, 3335, 3337, 3339, 3341, 3343, 3345, 3347, 3349,
3351, 3353, 3355, 3357, 3359, 3361, 3363, 3365, 3367, 3369, 3371, 3373, 3375,
3377, 3379, 3381, 3383, 3385, 3387, 3389, 3391, 3393, 3395, 3397, 3399, 3401,
3403, 3405, 3407, 3409, 3411, 3413, 3415, 3417, 3419, 3421, 3423, 3425, 3427,
3429, 3431, 3433, 3435, 3437, 3439, 3441, 3443, 3445, 3447, 3449, 3451, 3453,
3455, 3457, 3459, 3461, 3463, 3465, 3467, 3469, 3471, 3473, 3475, 3477, 3479,
3481, 3483, 3485, 3487, 3489, 3491, 3493, 3495, 3497, 3499, 3501, 3503, 3505,
3507, 3509, 3511, 3513, 3515, 3517, 3519, 3521, 3523, 3525, 3527, 3529, 3531,
3533, 3535, 3537, 3539, 3541, 3543, 3545, 3547, 3549, 3551, 3553, 3555, 3557,
3559, 3561, 3563, 3565, 3567, 3569, 3571, 3573, 3575, 3577, 3579, 3581, 3583,
3585, 3587, 3589, 3591, 3593, 3595, 3597, 3599, 3601, 3603, 3605, 3607, 3609,
3611, 3613, 3615, 3617, 3619, 3621, 3623, 3625, 3627, 3629, 3631, 3633, 3635,
3637, 3639, 3641, 3643, 3645, 3647, 3649, 3651, 3653, 3655, 3657, 3659, 3661,
3663, 3665, 3667, 3669, 3671, 3673, 3675, 3677, 3679, 3681, 3683, 3685, 3687,
3689, 3691, 3693, 3695, 3697, 3699, 3701, 3703, 3705, 3707, 3709, 3711, 3713,
3715, 3717, 3719, 3721, 3723, 3725, 3727, 3729, 3731, 3733, 3735, 3737, 3739,
3741, 3743, 3745, 3747, 3749, 3751, 3753, 3755, 3757, 3759, 3761, 3763, 3765,
3767, 3769, 3771, 3773, 3775, 3777, 3779, 3781, 3783, 3785, 3787, 3789, 3791,
3793, 3795, 3797, 3799, 3801, 3803, 3805, 3807, 3809, 3811, 3813, 3815, 3817,
3819, 3821, 3823, 3825, 3827, 3829, 3831, 3833, 3835, 3837, 3839, 3841, 3843,
3845, 3847, 3849, 3851, 3853, 3855, 3857, 3859, 3861, 3863, 3865, 3867, 3869,
3871, 3873, 3875, 3877, 3879, 3881, 3883, 3885, 3887, 3889, 3891, 3893, 3895,
3897, 3899, 3901, 3903, 3905, 3907, 3909, 3911, 3913, 3915, 3917, 3919, 3921,
3923, 3925, 3927, 3929, 3931, 3933, 3935, 3937, 3939, 3941, 3943, 3945, 3947,
3949, 3951, 3953, 3955, 3957, 3959, 3961, 3963, 3965, 3967, 3969, 3971, 3973,
3975, 3977, 3979, 3981, 3983, 3985, 3987, 3989, 3991, 3993, 3995, 3997, 3999,
4001, 4003, 4005, 4007, 4009, 4011, 4013, 4015, 4017, 4019, 4021, 4023, 4025,
4027, 4029, 4031, 4033, 4035, 4037, 4039, 4041, 4043, 4045, 4047, 4049, 4051,
4053, 4055, 4057, 4059, 4061, 4063, 4065, 4067, 4069, 4071, 4073, 4075, 4077,
4079, 4081, 4083, 4085, 4087, 4089, 4091, 4093, 4095, 4097, 4099, 4101, 4103,
4105, 4107, 4109, 4111, 4113, 4115, 4117, 4119, 4121, 4123, 4125, 4127, 4129,
4131, 4133, 4135, 4137, 4139, 4141, 4143, 4145, 4147, 4149, 4151, 4153, 4155,
4157, 4159, 4161, 4163, 4165, 4167, 4169, 4171, 4173, 4175, 4177, 4179, 4181,
4183, 4185, 4187, 4189, 4191, 4193, 4195, 4197, 4199, 4201, 4203, 4205, 4207,
4209, 4211, 4213, 4215, 4217, 4219, 4221, 4223, 4225, 4227, 4229, 4231, 4233,
4235, 4237, 4239, 4241, 4243, 4245, 4247, 4249, 4251, 4253, 4255, 4257, 4259,
4261, 4263, 4265, 4267, 4269, 4271, 4273, 4275, 4277, 4279, 4281, 4283, 4285,
4287, 4289, 4291, 4293, 4295, 4297, 4299, 4301, 4303, 4305, 4307, 4309, 4311,
4313, 4315, 4317, 4319, 4321, 4323, 4325, 4327, 4329, 4331, 4333, 4335, 4337,
4339, 4341, 4343, 4345, 4347, 4349, 4351, 4353, 4355, 4357, 4359, 4361, 4363,
4365, 4367, 4369, 4371, 4373, 4375, 4377, 4379, 4381, 4383, 4385, 4387, 4389,
4391, 4393, 4395, 4397, 4399, 4401, 4403, 4405, 4407, 4409, 4411, 4413, 4415,
4417, 4419, 4421, 4423, 4425, 4427, 4429, 4431, 4433, 4435, 4437, 4439, 4441,

4443, 4445, 4447, 4449, 4451, 4453, 4455, 4457, 4459, 4461, 4463, 4465, 4467,
4469, 4471, 4473, 4475, 4477, 4479, 4481, 4483, 4485, 4487, 4489, 4491, 4493,
4495, 4497, 4499, 4501, 4503, 4505, 4507, 4509, 4511, 4513, 4515, 4517, 4519,
4521, 4523, 4525, 4527, 4529, 4531, 4533, 4535, 4537, 4539, 4541, 4543, 4545,
4547, 4549, 4551, 4553, 4555, 4557, 4559, 4561, 4563, 4565, 4567, 4569, 4571,
4573, 4575, 4577, 4579, 4581, 4583, 4585, 4587, 4589, 4591, 4593, 4595, 4597,
4599, 4601, 4603, 4605, 4607, 4609, 4611, 4613, 4615, 4617, 4619, 4621, 4623,
4625, 4627, 4629, 4631, 4633, 4635, 4637, 4639, 4641, 4643, 4645, 4647, 4649,
4651, 4653, 4655, 4657, 4659, 4661, 4663, 4665, 4667, 4669, 4671, 4673, 4675,
4677, 4679, 4681, 4683, 4685, 4687, 4689, 4691, 4693, 4695, 4697, 4699, 4701,
4703, 4705, 4707, 4709, 4711, 4713, 4715, 4717, 4719, 4721, 4723, 4725, 4727,
4729, 4731, 4733, 4735, 4737, 4739, 4741, 4743, 4745, 4747, 4749, 4751, 4753,
4755, 4757, 4759, 4761, 4763, 4765, 4767, 4769, 4771, 4773, 4775, 4777, 4779,
4781, 4783, 4785, 4787, 4789, 4791, 4793, 4795, 4797, 4799, 4801, 4803, 4805,
4807, 4809, 4811, 4813, 4815, 4817, 4819, 4821, 4823, 4825, 4827, 4829, 4831,
4833, 4835, 4837, 4839, 4841, 4843, 4845, 4847, 4849, 4851, 4853, 4855, 4857,
4859, 4861, 4863, 4865, 4867, 4869, 4871, 4873, 4875, 4877, 4879, 4881, 4883,
4885, 4887, 4889, 4891, 4893, 4895, 4897, 4899, 4901, 4903, 4905, 4907, 4909,
4911, 4913, 4915, 4917, 4919, 4921, 4923, 4925, 4927, 4929, 4931, 4933, 4935,
4937, 4939, 4941, 4943, 4945, 4947, 4949, 4951, 4953, 4955, 4957, 4959, 4961,
4963, 4965, 4967, 4969, 4971, 4973, 4975, 4977, 4979, 4981, 4983, 4985, 4987,
4989, 4991, 4993, 4995, 4997, 4999, 5001, 5003, 5005, 5007, 5009, 5011, 5013,
5015, 5017, 5019, 5021, 5023, 5025, 5027, 5029, 5031, 5033, 5035, 5037, 5039,
5041, 5043, 5045, 5047, 5049, 5051, 5053, 5055, 5057, 5059, 5061, 5063, 5065,
5067, 5069, 5071, 5073, 5075, 5077, 5079, 5081, 5083, 5085, 5087, 5089, 5091,
5093, 5095, 5097, 5099, 5101, 5103, 5105, 5107, 5109, 5111, 5113, 5115, 5117,
5119, 5121, 5123, 5125, 5127, 5129, 5131, 5133, 5135, 5137, 5139, 5141, 5143,
5145, 5147, 5149, 5151, 5153, 5155, 5157, 5159, 5161, 5163, 5165, 5167, 5169,
5171, 5173, 5175, 5177, 5179, 5181, 5183, 5185, 5187, 5189, 5191, 5193, 5195,
5197, 5199, 5201, 5203, 5205, 5207, 5209, 5211, 5213, 5215, 5217, 5219, 5221,
5223, 5225, 5227, 5229, 5231, 5233, 5235, 5237, 5239, 5241, 5243, 5245, 5247,
5249, 5251, 5253, 5255, 5257, 5259, 5261, 5263, 5265, 5267, 5269, 5271, 5273,
5275, 5277, 5279, 5281, 5283, 5285, 5287, 5289, 5291, 5293, 5295, 5297, 5299,
5301, 5303, 5305, 5307, 5309, 5311, 5313, 5315, 5317, 5319, 5321, 5323, 5325,
5327, 5329, 5331, 5333, 5335, 5337, 5339, 5341, 5343, 5345, 5347, 5349, 5351,
5353, 5355, 5357, 5359, 5361, 5363, 5365, 5367, 5369, 5371, 5373, 5375, 5377,
5379, 5381, 5383, 5385, 5387, 5389, 5391, 5393, 5395, 5397, 5399, 5401, 5403,
5405, 5407, 5409, 5411, 5413, 5415, 5417, 5419, 5421, 5423, 5425, 5427, 5429,
5431, 5433, 5435, 5437, 5439, 5441, 5443, 5445, 5447, 5449, 5451, 5453, 5455,
5457, 5459, 5461, 5463, 5465, 5467, 5469, 5471, 5473, 5475, 5477, 5479, 5481,
5483, 5485, 5487, 5489, 5491, 5493, 5495, 5497, 5499, 5501, 5503, 5505, 5507,
5509, 5511, 5513, 5515, 5517, 5519, 5521, 5523, 5525, 5527, 5529, 5531, 5533,
5535, 5537, 5539, 5541, 5543, 5545, 5547, 5549, 5551, 5553, 5555, 5557, 5559,
5561, 5563, 5565, 5567, 5569, 5571, 5573, 5575, 5577, 5579, 5581, 5583, 5585,
5587, 5589, 5591, 5593, 5595, 5597, 5599, 5601, 5603, 5605, 5607, 5609, 5611,
5613, 5615, 5617, 5619, 5621, 5623, 5625, 5627, 5629, 5631, 5633, 5635, 5637,
5639, 5641, 5643, 5645, 5647, 5649, 5651, 5653, 5655, 5657, 5659, 5661, 5663,
5665, 5667, 5669, 5671, 5673, 5675, 5677, 5679, 5681, 5683, 5685, 5687, 5689,
5691, 5693, 5695, 5697, 5699, 5701, 5703, 5705, 5707, 5709, 5711, 5713, 5715,
5717, 5719, 5721, 5723, 5725, 5727, 5729, 5731, 5733, 5735, 5737, 5739, 5741,
5743, 5745, 5747, 5749, 5751, 5753, 5755, 5757, 5759, 5761, 5763, 5765, 5767,
5769, 5771, 5773, 5775, 5777, 5779, 5781, 5783, 5785, 5787, 5789, 5791, 5793,
5795, 5797, 5799, 5801, 5803, 5805, 5807, 5809, 5811, 5813, 5815, 5817, 5819,
5821, 5823, 5825, 5827, 5829, 5831, 5833, 5835, 5837, 5839, 5841, 5843, 5845,
5847, 5849, 5851, 5853, 5855, 5857, 5859, 5861, 5863, 5865, 5867, 5869, 5871,

5873, 5875, 5877, 5879, 5881, 5883, 5885, 5887, 5889, 5891, 5893, 5895, 5897,
5899, 5901, 5903, 5905, 5907, 5909, 5911, 5913, 5915, 5917, 5919, 5921, 5923,
5925, 5927, 5929, 5931, 5933, 5935, 5937, 5939, 5941, 5943, 5945, 5947, 5949,
5951, 5953, 5955, 5957, 5959, 5961, 5963, 5965, 5967, 5969, 5971, 5973, 5975,
5977, 5979, 5981, 5983, 5985, 5987, 5989, 5991, 5993, 5995, 5997, 5999, 6001,
6003, 6005, 6007, 6009, 6011, 6013, 6015, 6017, 6019, 6021, 6023, 6025, 6027,
6029, 6031, 6033, 6035, 6037, 6039, 6041, 6043, 6045, 6047, 6049, 6051, 6053,
6055, 6057, 6059, 6061, 6063, 6065, 6067, 6069, 6071, 6073, 6075, 6077, 6079,
6081, 6083, 6085, 6087, 6089, 6091, 6093, 6095, 6097, 6099, 6101, 6103, 6105,
6107, 6109, 6111, 6113, 6115, 6117, 6119, 6121, 6123, 6125, 6127, 6129, 6131,
6133, 6135, 6137, 6139, 6141, 6143, 6145, 6147, 6149, 6151, 6153, 6155, 6157,
6159, 6161, 6163, 6165, 6167, 6169, 6171, 6173, 6175, 6177, 6179, 6181, 6183,
6185, 6187, 6189, 6191, 6193, 6195, 6197, 6199, 6201, 6203, 6205, 6207, 6209,
6211, 6213, 6215, 6217, 6219, 6221, 6223, 6225, 6227, 6229, 6231, 6233, 6235,
6237, 6239, 6241, 6243, 6245, 6247, 6249, 6251, 6253, 6255, 6257, 6259, 6261,
6263, 6265, 6267, 6269, 6271, 6273, 6275, 6277, 6279, 6281, 6283, 6285, 6287,
6289, 6291, 6293, 6295, 6297, 6299, 6301, 6303, 6305, 6307, 6309, 6311, 6313,
6315, 6317, 6319, 6321, 6323, 6325, 6327, 6329, 6331, 6333, 6335, 6337, 6339,
6341, 6343, 6345, 6347, 6349, 6351, 6353, 6355, 6357, 6359, 6361, 6363, 6365,
6367, 6369, 6371, 6373, 6375, 6377, 6379, 6381, 6383, 6385, 6387, 6389, 6391,
6393, 6395, 6397, 6399, 6401, 6403, 6405, 6407, 6409, 6411, 6413, 6415, 6417,
6419, 6421, 6423, 6425, 6427, 6429, 6431, 6433, 6435, 6437, 6439, 6441, 6443,
6445, 6447, 6449, 6451, 6453, 6455, 6457, 6459, 6461, 6463, 6465, 6467, 6469,
6471, 6473, 6475, 6477, 6479, 6481, 6483, 6485, 6487, 6489, 6491, 6493, 6495,
6497, 6499, 6501, 6503, 6505, 6507, 6509, 6511, 6513, 6515, 6517, 6519, 6521,
6523, 6525, 6527, 6529, 6531, 6533, 6535, 6537, 6539, 6541, 6543, 6545, 6547,
6549, 6551, 6553, 6555, 6557, 6559, 6561, 6563, 6565, 6567, 6569, 6571, 6573,
6575, 6577, 6579, 6581, 6583, 6585, 6587, 6589, 6591, 6593, 6595, 6597, 6599,
6601, 6603, 6605, 6607, 6609, 6611, 6613, 6615, 6617, 6619, 6621, 6623, 6625,
6627, 6629, 6631, 6633, 6635, 6637, 6639, 6641, 6643, 6645, 6647, 6649, 6651,
6653, 6655, 6657, 6659, 6661, 6663, 6665, 6667, 6669, 6671, 6673, 6675, 6677,
6679, 6681, 6683, 6685, 6687, 6689, 6691, 6693, 6695, 6697, 6699, 6701, 6703,
6705, 6707, 6709, 6711, 6713, 6715, 6717, 6719, 6721, 6723, 6725, 6727, 6729,
6731, 6733, 6735, 6737, 6739, 6741, 6743, 6745, 6747, 6749, 6751, 6753, 6755,
6757, 6759, 6761, 6763, 6765, 6767, 6769, 6771, 6773, 6775, 6777, 6779, 6781,
6783, 6785, 6787, 6789, 6791, 6793, 6795, 6797, 6799, 6801, 6803, 6805, 6807,
6809, 6811, 6813, 6815, 6817, 6819, 6821, 6823, 6825, 6827, 6829, 6831, 6833,
6835, 6837, 6839, 6841, 6843, 6845, 6847, 6849, 6851, 6853, 6855, 6857, 6859,
6861, 6863, 6865, 6867, 6869, 6871, 6873, 6875, 6877, 6879, 6881, 6883, 6885,
6887, 6889, 6891, 6893, 6895, 6897, 6899, 6901, 6903, 6905, 6907, 6909, 6911,
6913, 6915, 6917, 6919, 6921, 6923, 6925, 6927, 6929, 6931, 6933, 6935, 6937,
6939, 6941, 6943, 6945, 6947, 6949, 6951, 6953, 6955, 6957, 6959, 6961, 6963,
6965, 6967, 6969, 6971, 6973, 6975, 6977, 6979, 6981, 6983, 6985, 6987, 6989,
6991, 6993, 6995, 6997, 6999, 7001, 7003, 7005, 7007, 7009, 7011, 7013, 7015,
7017, 7019, 7021, 7023, 7025, 7027, 7029, 7031, 7033, 7035, 7037, 7039, 7041,
7043, 7045, 7047, 7049, 7051, 7053, 7055, 7057, 7059, 7061, 7063, 7065, 7067,
7069, 7071, 7073, 7075, 7077, 7079, 7081, 7083, 7085, 7087, 7089, 7091, 7093,
7095, 7097, 7099, 7101, 7103, 7105, 7107, 7109, 7111, 7113, 7115, 7117, 7119,
7121, 7123, 7125, 7127, 7129, 7131, 7133, 7135, 7137, 7139, 7141, 7143, 7145,
7147, 7149, 7151, 7153, 7155, 7157, 7159, 7161, 7163, 7165, 7167, 7169, 7171,
7173, 7175, 7177, 7179, 7181, 7183, 7185, 7187, 7189, 7191, 7193, 7195, 7197,
7199, 7201, 7203, 7205, 7207, 7209, 7211, 7213, 7215, 7217, 7219, 7221, 7223,
7225, 7227, 7229, 7231, 7233, 7235, 7237, 7239, 7241, 7243, 7245, 7247, 7249,
7251, 7253, 7255, 7257, 7259, 7261, 7263, 7265, 7267, 7269, 7271, 7273, 7275,
7277, 7279, 7281, 7283, 7285, 7287, 7289, 7291, 7293, 7295, 7297, 7299, 7301,

7303, 7305, 7307, 7309, 7311, 7313, 7315, 7317, 7319, 7321, 7323, 7325, 7327, 7329, 7331, 7333, 7335, 7337, 7339, 7341, 7343, 7345, 7347, 7349, 7351, 7353, 7355, 7357, 7359, 7361, 7363, 7365, 7367, 7369, 7371, 7373, 7375, 7377, 7379, 7381, 7383, 7385, 7387, 7389, 7391, 7393, 7395, 7397, 7399, 7401, 7403, 7405, 7407, 7409, 7411, 7413, 7415, 7417, 7419, 7421, 7423, 7425, 7427, 7429, 7431, 7433, 7435, 7437, 7439, 7441, 7443, 7445, 7447, 7449, 7451, 7453, 7455, 7457, 7459, 7461, 7463, 7465, 7467, 7469, 7471, 7473, 7475, 7477, 7479, 7481, 7483, 7485, 7487, 7489, 7491, 7493, 7495, 7497, 7499, 7501, 7503, 7505, 7507, 7509, 7511, 7513, 7515, 7517, 7519, 7521, 7523, 7525, 7527, 7529, 7531, 7533, 7535, 7537, 7539, 7541, 7543, 7545, 7547, 7549, 7551, 7553, 7555, 7557, 7559, 7561, 7563, 7565, 7567, 7569, 7571, 7573, 7575, 7577, 7579, 7581, 7583, 7585, 7587, 7589, 7591, 7593, 7595, 7597, 7599, 7601, 7603, 7605, 7607, 7609, 7611, 7613, 7615, 7617, 7619, 7621, 7623, 7625, 7627, 7629, 7631, 7633, 7635, 7637, 7639, 7641, 7643, 7645, 7647, 7649, 7651, 7653, 7655, 7657, 7659, 7661, 7663, 7665, 7667, 7669, 7671, 7673, 7675, 7677, 7679, 7681, 7683, 7685, 7687, 7689, 7691, 7693, 7695, 7697, 7699, 7701, 7703, 7705, 7707, 7709, 7711, 7713, 7715, 7717, 7719, 7721, 7723, 7725, 7727, 7729, 7731, 7733, 7735, 7737, 7739, 7741, 7743, 7745, 7747, 7749, 7751, 7753, 7755, 7757, 7759, 7761, 7763, 7765, 7767, 7769, 7771, 7773, 7775, 7777, 7779, 7781, 7783, 7785, 7787, 7789, 7791, 7793, 7795, 7797, 7799, 7801, 7803, 7805, 7807, 7809, 7811, 7813, 7815, 7817, 7819, 7821, 7823, 7825, 7827, 7829, 7831, 7833, 7835, 7837, 7839, 7841, 7843, 7845, 7847, 7849, 7851, 7853, 7855, 7857, 7859, 7861, 7863, 7865, 7867, 7869, 7871, 7873, 7875, 7877, 7879, 7881, 7883, 7885, 7887, 7889, 7891, 7893, 7895, 7897, 7899, 7901, 7903, 7905, 7907, 7909, 7911, 7913, 7915, 7917, 7919, 7921, 7923, 7925, 7927, 7929, 7931, 7933, 7935, 7937, 7939, 7941, 7943, 7945, 7947, 7949, 7951, 7953, 7955, 7957, 7959, 7961, 7963, 7965, 7967, 7969, 7971, 7973, 7975, 7977, 7979, 7981, 7983, 7985, 7987, 7989, 7991, 7993, 7995, 7997, 7999, 8001, 8003, 8005, 8007, 8009, 8011, 8013, 8015, 8017, 8019, 8021, 8023, 8025, 8027, 8029, 8031, 8033, 8035, 8037, 8039, 8041, 8043, 8045, 8047, 8049, 8051, 8053, 8055, 8057, 8059, 8061, 8063, 8065, 8067, 8069, 8071, 8073, 8075, 8077, 8079, 8081, 8083, 8085, 8087, 8089, 8091, 8093, 8095, 8097, 8099, 8101, 8103, 8105, 8107, 8109, 8111, 8113, 8115, 8117, 8119, 8121, 8123, 8125, 8127, 8129, 8131, 8133, 8135, 8137, 8139, 8141, 8143, 8145, 8147, 8149, 8151, 8153, 8155, 8157, 8159, 8161, 8163, 8165, 8167, 8169, 8171, 8173, 8175, 8177, 8179, 8181, 8183, 8185, 8187, 8189, 8191, 8193, 8195, 8197, 8199, 8201, 8203, 8205, 8207, 8209, 8211, 8213, 8215, 8217, 8219, 8221, 8223, 8225, 8227, 8229, 8231, 8233, 8235, 8237, 8239, 8241, 8243, 8245, 8247, 8249, 8251, 8253, 8255, 8257, 8259, 8261, 8263, 8265, 8267, 8269, 8271, 8273, 8275, 8277, 8279, 8281, 8283, 8285, 8287, 8289, 8291, 8293, 8295, 8297, 8299, 8301, 8303, 8305, 8307, 8309, 8311, 8313, 8315, 8317, 8319, 8321, 8323, 8325, 8327, 8329, 8331, 8333, 8335, 8337, 8339, 8341, 8343, 8345, 8347, 8349, 8351, 8353, 8355, 8357, 8359, 8361, 8363, 8365, 8367, 8369, 8371, 8373, 8375, 8377, 8379, 8381, 8383, 8385, 8387, 8389, 8391, 8393, 8395, 8397, 8399, 8401, 8403, 8405, 8407, 8409, 8411, 8413, 8415, 8417, 8419, 8421, 8423, 8425, 8427, 8429, 8431, 8433, 8435, 8437, 8439, 8441, 8443, 8445, 8447, 8449, 8451, 8453, 8455, 8457, 8459, 8461, 8463, 8465, 8467, 8469, 8471, 8473, 8475, 8477, 8479, 8481, 8483, 8485, 8487, 8489, 8491, 8493, 8495, 8497, 8499, 8501, 8503, 8505, 8507, 8509, 8511, 8513, 8515, 8517, 8519, 8521, 8523, 8525, 8527, 8529, 8531, 8533, 8535, 8537, 8539, 8541, 8543, 8545, 8547, 8549, 8551, 8553, 8555, 8557, 8559, 8561, 8563, 8565, 8567, 8569, 8571, 8573, 8575, 8577, 8579, 8581, 8583, 8585, 8587, 8589, 8591, 8593, 8595, 8597, 8599, 8601, 8603, 8605, 8607, 8609, 8611, 8613, 8615, 8617, 8619, 8621, 8623, 8625, 8627, 8629, 8631, 8633, 8635, 8637, 8639, 8641, 8643, 8645, 8647, 8649, 8651, 8653, 8655, 8657, 8659, 8661, 8663, 8665, 8667, 8669, 8671, 8673, 8675, 8677, 8679, 8681, 8683, 8685, 8687, 8689, 8691, 8693, 8695, 8697, 8699, 8701, 8703, 8705, 8707, 8709, 8711, 8713, 8715, 8717, 8719, 8721, 8723, 8725, 8727, 8729, 8731,

8733, 8735, 8737, 8739, 8741, 8743, 8745, 8747, 8749, 8751, 8753, 8755, 8757, 8759, 8761, 8763, 8765, 8767, 8769, 8771, 8773, 8775, 8777, 8779, 8781, 8783, 8785, 8787, 8789, 8791, 8793, 8795, 8797, 8799, 8801, 8803, 8805, 8807, 8809, 8811, 8813, 8815, 8817, 8819, 8821, 8823, 8825, 8827, 8829, 8831, 8833, 8835, 8837, 8839, 8841, 8843, 8845, 8847, 8849, 8851, 8853, 8855, 8857, 8859, 8861, 8863, 8865, 8867, 8869, 8871, 8873, 8875, 8877, 8879, 8881, 8883, 8885, 8887, 8889, 8891, 8893, 8895, 8897, 8899, 8901, 8903, 8905, 8907, 8909, 8911, 8913, 8915, 8917, 8919, 8921, 8923, 8925, 8927, 8929, 8931, 8933, 8935, 8937, 8939, 8941, 8943, 8945, 8947, 8949, 8951, 8953, 8955, 8957, 8959, 8961, 8963, 8965, 8967, 8969, 8971, 8973, 8975, 8977, 8979, 8981, 8983, 8985, 8987, 8989, 8991, 8993, 8995, 8997, 8999, 9001, 9003, 9005, 9007, 9009, 9011, 9013, 9015, 9017, 9019, 9021, 9023, 9025, 9027, 9029, 9031, 9033, 9035, 9037, 9039, 9041, 9043, 9045, 9047, 9049, 9051, 9053, 9055, 9057, 9059, 9061, 9063, 9065, 9067, 9069, 9071, 9073, 9075, 9077, 9079, 9081, 9083, 9085, 9087, 9089, 9091, 9093, 9095, 9097, 9099, 9101, 9103, 9105, 9107, 9109, 9111, 9113, 9115, 9117, 9119, 9121, 9123, 9125, 9127, 9129, 9131, 9133, 9135, 9137, 9139, 9141, 9143, 9145, 9147, 9149, 9151, 9153, 9155, 9157, 9159, 9161, 9163, 9165, 9167, 9169, 9171, 9173, 9175, 9177, 9179, 9181, 9183, 9185, 9187, 9189, 9191, 9193, 9195, 9197, 9199, 9201, 9203, 9205, 9207, 9209, 9211, 9213, 9215, 9217, 9219, 9221, 9223, 9225, 9227, 9229, 9231, 9233, 9235, 9237, 9239, 9241, 9243, 9245, 9247, 9249, 9251, 9253, 9255, 9257, 9259, 9261, 9263, 9265, 9267, 9269, 9271, 9273, 9275, 9277, 9279, 9281, 9283, 9285, 9287, 9289, 9291, 9293, 9295, 9297, 9299, 9301, 9303, 9305, 9307, 9309, 9311, 9313, 9315, 9317, 9319, 9321, 9323, 9325, 9327, 9329, 9331, 9333, 9335, 9337, 9339, 9341, 9343, 9345, 9347, 9349, 9351, 9353, 9355, 9357, 9359, 9361, 9363, 9365, 9367, 9369, 9371, 9373, 9375, 9377, 9379, 9381, 9383, 9385, 9387, 9389, 9391, 9393, 9395, 9397, 9399, 9401, 9403, 9405, 9407, 9409, 9411, 9413, 9415, 9417, 9419, 9421, 9423, 9425, 9427, 9429, 9431, 9433, 9435, 9437, 9439, 9441, 9443, 9445, 9447, 9449, 9451, 9453, 9455, 9457, 9459, 9461, 9463, 9465, 9467, 9469, 9471, 9473, 9475, 9477, 9479, 9481, 9483, 9485, 9487, 9489, 9491, 9493, 9495, 9497, 9499, 9501, 9503, 9505, 9507, 9509, 9511, 9513, 9515, 9517, 9519, 9521, 9523, 9525, 9527, 9529, 9531, 9533, 9535, 9537, 9539, 9541, 9543, 9545, 9547, 9549, 9551, 9553, 9555, 9557, 9559, 9561, 9563, 9565, 9567, 9569, 9571, 9573, 9575, 9577, 9579, 9581, 9583, 9585, 9587, 9589, 9591, 9593, 9595, 9597, 9599, 9601, 9603, 9605, 9607, 9609, 9611, 9613, 9615, 9617, 9619, 9621, 9623, 9625, 9627, 9629, 9631, 9633, 9635, 9637, 9639, 9641, 9643, 9645, 9647, 9649, 9651, 9653, 9655, 9657, 9659, 9661, 9663, 9665, 9667, 9669, 9671, 9673, 9675, 9677, 9679, 9681, 9683, 9685, 9687, 9689, 9691, 9693, 9695, 9697, 9699, 9701, 9703, 9705, 9707, 9709, 9711, 9713, 9715, 9717, 9719, 9721, 9723, 9725, 9727, 9729, 9731, 9733, 9735, 9737, 9739, 9741, 9743, 9745, 9747, 9749, 9751, 9753, 9755, 9757, 9759, 9761, 9763, 9765, 9767, 9769, 9771, 9773, 9775, 9777, 9779, 9781, 9783, 9785, 9787, 9789, 9791, 9793, 9795, 9797, 9799, 9801, 9803, 9805, 9807, 9809, 9811, 9813, 9815, 9817, 9819, 9821, 9823, 9825, 9827, 9829, 9831, 9833, 9835, 9837, 9839, 9841, 9843, 9845, 9847, 9849, 9851, 9853, 9855, 9857, 9859, 9861, 9863, 9865, 9867, 9869, 9871, 9873, 9875, 9877, 9879, 9881, 9883, 9885, 9887, 9889, 9891, 9893, 9895, 9897, 9899, 9901, 9903, 9905, 9907, 9909, 9911, 9913, 9915, 9917, 9919, 9921, 9923, 9925, 9927, 9929, 9931, 9933, 9935, 9937, 9939, 9941, 9943, 9945, 9947, 9949, 9951, 9953, 9955, 9957, 9959, 9961, 9963, 9965, 9967, 9969, 9971, 9973, 9975, 9977, 9979, 9981, 9983, 9985, 9987, 9989, 9991, 9993, 9995, 9997, 9999]

Output

1 | 4999.5

Input 3

```

1  [1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39,
   41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77,
   79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111,
   113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141,
   143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171,
   173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199]
2  [0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38,
   40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76,
   78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110,
   112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140,
   142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170,
   172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198]

```

Output

```

1  99.5

```

Problem 2

Write a function `KthElement(A,B,k)` that accept two sorted list A and B of the size `n` and `m` respectively and a integer value `k` and function return Kth element in the sorted merged list of A and B from start. write a solution of order $O(\log n + \log m)$.

Sample Input

```

1  [1,3,5,7]
2  [2,4,5,8]
3  3

```

Output

```

1  3

```

Sample Input

```

1  [1,2,3,4]
2  [7,8,9,10,12,13]
3  4

```

Output

```

1  4

```

Solution

Solution Code

```
1 def kth(arr1, arr2, n, m, k):
2     if n == 1 or m == 1:
3         if m == 1:
4             arr2, arr1 = arr1, arr2
5             n, m = m, n
6         if k == 1:
7             return min(arr1[0], arr2[0])
8         elif k == m + n:
9             return max(arr1[0], arr2[m-1])
10        else:
11            if arr2[k - 2] > arr1[0]:
12                return arr2[k - 2]
13            else:
14                return min(arr1[0], arr2[k - 1])
15
16    mid1 = (n - 1)//2
17    mid2 = (m - 1)//2
18
19    if k > mid1 + mid2 + 1 :
20        if arr1[mid1] < arr2[mid2]:
21            return kth(arr1[mid1 + 1:], arr2, n - mid1 - 1, m, k - mid1 - 1)
22        else:
23            return kth(arr1, arr2[mid2 + 1:], n, m - mid2 - 1, k - mid2 - 1)
24    else:
25        if arr1[mid1] < arr2[mid2]:
26            return kth(arr1, arr2[:mid2 + 1], n, mid2 + 1, k)
27        else:
28            return kth(arr1[:mid1 + 1], arr2, mid1 + 1, m, k)
29 def kthElement(A,B,k):
30     return kth(A,B,len(A),len(B),k)
```

Suffix code(Visible)

```
1 def kth1(arr1, arr2, n, m, k):
2     if n == 1 or m == 1:
3         if m == 1:
4             arr2, arr1 = arr1, arr2
5             n, m = m, n
6         if k == 1:
7             return min(arr1[0], arr2[0])
8         elif k == m + n:
9             return max(arr1[0], arr2[m-1])
10        else:
11            if arr2[k - 2] > arr1[0]:
12                return arr2[k - 2]
13            else:
14                return min(arr1[0], arr2[k - 1])
15
16    mid1 = (n - 1)//2
17    mid2 = (m - 1)//2
```



```

18
19     if mid1+mid2+1 < k:
20         if arr1[mid1] < arr2[mid2]:
21             return kth1(arr1[mid1 + 1:], arr2, n - mid1 - 1, m, k - mid1 -
1)
22         else:
23             return kth1(arr1, arr2[mid2 + 1:], n, m - mid2 - 1, k - mid2 -
1)
24     else:
25         if arr1[mid1] < arr2[mid2]:
26             return kth1(arr1, arr2[:mid2 + 1], n, mid2 + 1, k)
27         else:
28             return kth1(arr1[:mid1 + 1], arr2, mid1 + 1, m, k)
29 def kthElement1(A,B,k):
30     return kth1(A,B,len(A),len(B),k)
31
32
33
34 A = eval(input())
35 B = eval(input())
36 k = int(input())
37 import time
38 t1 = time.perf_counter()
39 res = KthElement(A,B,k)
40 elapsedStudent = time.perf_counter() - t1
41
42 t1 = time.perf_counter()
43 res1 = KthElement1(A,B,k)
44 elapsedIdeal = time.perf_counter() - t1
45
46 timeout = elapsedIdeal
47 if (elapsedStudent > timeout*3):
48     print("Timed Out. Write efficient code. Elapsed: " +
str(elapsedStudent))
49 else:
50     print(res)

```

Public Test case

Input 1

```

1 | [1,3,5,7]
2 | [2,4,5,8]
3 | 3

```

Output

```

1 | 3

```

Input 2

1 [0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580,

1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606,
1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632,
1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658,
1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684,
1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710,
1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736,
1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762,
1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788,
1790, 1792, 1794, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1812, 1814,
1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840,
1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866,
1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892,
1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918,
1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944,
1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970,
1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996,
1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022,
2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048,
2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 2074,
2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100,
2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126,
2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152,
2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178,
2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204,
2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230,
2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256,
2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282,
2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308,
2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334,
2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360,
2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386,
2388, 2390, 2392, 2394, 2396, 2398, 2400, 2402, 2404, 2406, 2408, 2410, 2412,
2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438,
2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464,
2466, 2468, 2470, 2472, 2474, 2476, 2478, 2480, 2482, 2484, 2486, 2488, 2490,
2492, 2494, 2496, 2498, 2500, 2502, 2504, 2506, 2508, 2510, 2512, 2514, 2516,
2518, 2520, 2522, 2524, 2526, 2528, 2530, 2532, 2534, 2536, 2538, 2540, 2542,
2544, 2546, 2548, 2550, 2552, 2554, 2556, 2558, 2560, 2562, 2564, 2566, 2568,
2570, 2572, 2574, 2576, 2578, 2580, 2582, 2584, 2586, 2588, 2590, 2592, 2594,
2596, 2598, 2600, 2602, 2604, 2606, 2608, 2610, 2612, 2614, 2616, 2618, 2620,
2622, 2624, 2626, 2628, 2630, 2632, 2634, 2636, 2638, 2640, 2642, 2644, 2646,
2648, 2650, 2652, 2654, 2656, 2658, 2660, 2662, 2664, 2666, 2668, 2670, 2672,
2674, 2676, 2678, 2680, 2682, 2684, 2686, 2688, 2690, 2692, 2694, 2696, 2698,
2700, 2702, 2704, 2706, 2708, 2710, 2712, 2714, 2716, 2718, 2720, 2722, 2724,
2726, 2728, 2730, 2732, 2734, 2736, 2738, 2740, 2742, 2744, 2746, 2748, 2750,
2752, 2754, 2756, 2758, 2760, 2762, 2764, 2766, 2768, 2770, 2772, 2774, 2776,
2778, 2780, 2782, 2784, 2786, 2788, 2790, 2792, 2794, 2796, 2798, 2800, 2802,
2804, 2806, 2808, 2810, 2812, 2814, 2816, 2818, 2820, 2822, 2824, 2826, 2828,
2830, 2832, 2834, 2836, 2838, 2840, 2842, 2844, 2846, 2848, 2850, 2852, 2854,
2856, 2858, 2860, 2862, 2864, 2866, 2868, 2870, 2872, 2874, 2876, 2878, 2880,
2882, 2884, 2886, 2888, 2890, 2892, 2894, 2896, 2898, 2900, 2902, 2904, 2906,
2908, 2910, 2912, 2914, 2916, 2918, 2920, 2922, 2924, 2926, 2928, 2930, 2932,
2934, 2936, 2938, 2940, 2942, 2944, 2946, 2948, 2950, 2952, 2954, 2956, 2958,
2960, 2962, 2964, 2966, 2968, 2970, 2972, 2974, 2976, 2978, 2980, 2982, 2984,
2986, 2988, 2990, 2992, 2994, 2996, 2998, 3000, 3002, 3004, 3006, 3008, 3010,

3012, 3014, 3016, 3018, 3020, 3022, 3024, 3026, 3028, 3030, 3032, 3034, 3036,
3038, 3040, 3042, 3044, 3046, 3048, 3050, 3052, 3054, 3056, 3058, 3060, 3062,
3064, 3066, 3068, 3070, 3072, 3074, 3076, 3078, 3080, 3082, 3084, 3086, 3088,
3090, 3092, 3094, 3096, 3098, 3100, 3102, 3104, 3106, 3108, 3110, 3112, 3114,
3116, 3118, 3120, 3122, 3124, 3126, 3128, 3130, 3132, 3134, 3136, 3138, 3140,
3142, 3144, 3146, 3148, 3150, 3152, 3154, 3156, 3158, 3160, 3162, 3164, 3166,
3168, 3170, 3172, 3174, 3176, 3178, 3180, 3182, 3184, 3186, 3188, 3190, 3192,
3194, 3196, 3198, 3200, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218,
3220, 3222, 3224, 3226, 3228, 3230, 3232, 3234, 3236, 3238, 3240, 3242, 3244,
3246, 3248, 3250, 3252, 3254, 3256, 3258, 3260, 3262, 3264, 3266, 3268, 3270,
3272, 3274, 3276, 3278, 3280, 3282, 3284, 3286, 3288, 3290, 3292, 3294, 3296,
3298, 3300, 3302, 3304, 3306, 3308, 3310, 3312, 3314, 3316, 3318, 3320, 3322,
3324, 3326, 3328, 3330, 3332, 3334, 3336, 3338, 3340, 3342, 3344, 3346, 3348,
3350, 3352, 3354, 3356, 3358, 3360, 3362, 3364, 3366, 3368, 3370, 3372, 3374,
3376, 3378, 3380, 3382, 3384, 3386, 3388, 3390, 3392, 3394, 3396, 3398, 3400,
3402, 3404, 3406, 3408, 3410, 3412, 3414, 3416, 3418, 3420, 3422, 3424, 3426,
3428, 3430, 3432, 3434, 3436, 3438, 3440, 3442, 3444, 3446, 3448, 3450, 3452,
3454, 3456, 3458, 3460, 3462, 3464, 3466, 3468, 3470, 3472, 3474, 3476, 3478,
3480, 3482, 3484, 3486, 3488, 3490, 3492, 3494, 3496, 3498, 3500, 3502, 3504,
3506, 3508, 3510, 3512, 3514, 3516, 3518, 3520, 3522, 3524, 3526, 3528, 3530,
3532, 3534, 3536, 3538, 3540, 3542, 3544, 3546, 3548, 3550, 3552, 3554, 3556,
3558, 3560, 3562, 3564, 3566, 3568, 3570, 3572, 3574, 3576, 3578, 3580, 3582,
3584, 3586, 3588, 3590, 3592, 3594, 3596, 3598, 3600, 3602, 3604, 3606, 3608,
3610, 3612, 3614, 3616, 3618, 3620, 3622, 3624, 3626, 3628, 3630, 3632, 3634,
3636, 3638, 3640, 3642, 3644, 3646, 3648, 3650, 3652, 3654, 3656, 3658, 3660,
3662, 3664, 3666, 3668, 3670, 3672, 3674, 3676, 3678, 3680, 3682, 3684, 3686,
3688, 3690, 3692, 3694, 3696, 3698, 3700, 3702, 3704, 3706, 3708, 3710, 3712,
3714, 3716, 3718, 3720, 3722, 3724, 3726, 3728, 3730, 3732, 3734, 3736, 3738,
3740, 3742, 3744, 3746, 3748, 3750, 3752, 3754, 3756, 3758, 3760, 3762, 3764,
3766, 3768, 3770, 3772, 3774, 3776, 3778, 3780, 3782, 3784, 3786, 3788, 3790,
3792, 3794, 3796, 3798, 3800, 3802, 3804, 3806, 3808, 3810, 3812, 3814, 3816,
3818, 3820, 3822, 3824, 3826, 3828, 3830, 3832, 3834, 3836, 3838, 3840, 3842,
3844, 3846, 3848, 3850, 3852, 3854, 3856, 3858, 3860, 3862, 3864, 3866, 3868,
3870, 3872, 3874, 3876, 3878, 3880, 3882, 3884, 3886, 3888, 3890, 3892, 3894,
3896, 3898, 3900, 3902, 3904, 3906, 3908, 3910, 3912, 3914, 3916, 3918, 3920,
3922, 3924, 3926, 3928, 3930, 3932, 3934, 3936, 3938, 3940, 3942, 3944, 3946,
3948, 3950, 3952, 3954, 3956, 3958, 3960, 3962, 3964, 3966, 3968, 3970, 3972,
3974, 3976, 3978, 3980, 3982, 3984, 3986, 3988, 3990, 3992, 3994, 3996, 3998,
4000, 4002, 4004, 4006, 4008, 4010, 4012, 4014, 4016, 4018, 4020, 4022, 4024,
4026, 4028, 4030, 4032, 4034, 4036, 4038, 4040, 4042, 4044, 4046, 4048, 4050,
4052, 4054, 4056, 4058, 4060, 4062, 4064, 4066, 4068, 4070, 4072, 4074, 4076,
4078, 4080, 4082, 4084, 4086, 4088, 4090, 4092, 4094, 4096, 4098, 4100, 4102,
4104, 4106, 4108, 4110, 4112, 4114, 4116, 4118, 4120, 4122, 4124, 4126, 4128,
4130, 4132, 4134, 4136, 4138, 4140, 4142, 4144, 4146, 4148, 4150, 4152, 4154,
4156, 4158, 4160, 4162, 4164, 4166, 4168, 4170, 4172, 4174, 4176, 4178, 4180,
4182, 4184, 4186, 4188, 4190, 4192, 4194, 4196, 4198, 4200, 4202, 4204, 4206,
4208, 4210, 4212, 4214, 4216, 4218, 4220, 4222, 4224, 4226, 4228, 4230, 4232,
4234, 4236, 4238, 4240, 4242, 4244, 4246, 4248, 4250, 4252, 4254, 4256, 4258,
4260, 4262, 4264, 4266, 4268, 4270, 4272, 4274, 4276, 4278, 4280, 4282, 4284,
4286, 4288, 4290, 4292, 4294, 4296, 4298, 4300, 4302, 4304, 4306, 4308, 4310,
4312, 4314, 4316, 4318, 4320, 4322, 4324, 4326, 4328, 4330, 4332, 4334, 4336,
4338, 4340, 4342, 4344, 4346, 4348, 4350, 4352, 4354, 4356, 4358, 4360, 4362,
4364, 4366, 4368, 4370, 4372, 4374, 4376, 4378, 4380, 4382, 4384, 4386, 4388,
4390, 4392, 4394, 4396, 4398, 4400, 4402, 4404, 4406, 4408, 4410, 4412, 4414,
4416, 4418, 4420, 4422, 4424, 4426, 4428, 4430, 4432, 4434, 4436, 4438, 4440,

4442, 4444, 4446, 4448, 4450, 4452, 4454, 4456, 4458, 4460, 4462, 4464, 4466,
4468, 4470, 4472, 4474, 4476, 4478, 4480, 4482, 4484, 4486, 4488, 4490, 4492,
4494, 4496, 4498, 4500, 4502, 4504, 4506, 4508, 4510, 4512, 4514, 4516, 4518,
4520, 4522, 4524, 4526, 4528, 4530, 4532, 4534, 4536, 4538, 4540, 4542, 4544,
4546, 4548, 4550, 4552, 4554, 4556, 4558, 4560, 4562, 4564, 4566, 4568, 4570,
4572, 4574, 4576, 4578, 4580, 4582, 4584, 4586, 4588, 4590, 4592, 4594, 4596,
4598, 4600, 4602, 4604, 4606, 4608, 4610, 4612, 4614, 4616, 4618, 4620, 4622,
4624, 4626, 4628, 4630, 4632, 4634, 4636, 4638, 4640, 4642, 4644, 4646, 4648,
4650, 4652, 4654, 4656, 4658, 4660, 4662, 4664, 4666, 4668, 4670, 4672, 4674,
4676, 4678, 4680, 4682, 4684, 4686, 4688, 4690, 4692, 4694, 4696, 4698, 4700,
4702, 4704, 4706, 4708, 4710, 4712, 4714, 4716, 4718, 4720, 4722, 4724, 4726,
4728, 4730, 4732, 4734, 4736, 4738, 4740, 4742, 4744, 4746, 4748, 4750, 4752,
4754, 4756, 4758, 4760, 4762, 4764, 4766, 4768, 4770, 4772, 4774, 4776, 4778,
4780, 4782, 4784, 4786, 4788, 4790, 4792, 4794, 4796, 4798, 4800, 4802, 4804,
4806, 4808, 4810, 4812, 4814, 4816, 4818, 4820, 4822, 4824, 4826, 4828, 4830,
4832, 4834, 4836, 4838, 4840, 4842, 4844, 4846, 4848, 4850, 4852, 4854, 4856,
4858, 4860, 4862, 4864, 4866, 4868, 4870, 4872, 4874, 4876, 4878, 4880, 4882,
4884, 4886, 4888, 4890, 4892, 4894, 4896, 4898, 4900, 4902, 4904, 4906, 4908,
4910, 4912, 4914, 4916, 4918, 4920, 4922, 4924, 4926, 4928, 4930, 4932, 4934,
4936, 4938, 4940, 4942, 4944, 4946, 4948, 4950, 4952, 4954, 4956, 4958, 4960,
4962, 4964, 4966, 4968, 4970, 4972, 4974, 4976, 4978, 4980, 4982, 4984, 4986,
4988, 4990, 4992, 4994, 4996, 4998, 5000, 5002, 5004, 5006, 5008, 5010, 5012,
5014, 5016, 5018, 5020, 5022, 5024, 5026, 5028, 5030, 5032, 5034, 5036, 5038,
5040, 5042, 5044, 5046, 5048, 5050, 5052, 5054, 5056, 5058, 5060, 5062, 5064,
5066, 5068, 5070, 5072, 5074, 5076, 5078, 5080, 5082, 5084, 5086, 5088, 5090,
5092, 5094, 5096, 5098, 5100, 5102, 5104, 5106, 5108, 5110, 5112, 5114, 5116,
5118, 5120, 5122, 5124, 5126, 5128, 5130, 5132, 5134, 5136, 5138, 5140, 5142,
5144, 5146, 5148, 5150, 5152, 5154, 5156, 5158, 5160, 5162, 5164, 5166, 5168,
5170, 5172, 5174, 5176, 5178, 5180, 5182, 5184, 5186, 5188, 5190, 5192, 5194,
5196, 5198, 5200, 5202, 5204, 5206, 5208, 5210, 5212, 5214, 5216, 5218, 5220,
5222, 5224, 5226, 5228, 5230, 5232, 5234, 5236, 5238, 5240, 5242, 5244, 5246,
5248, 5250, 5252, 5254, 5256, 5258, 5260, 5262, 5264, 5266, 5268, 5270, 5272,
5274, 5276, 5278, 5280, 5282, 5284, 5286, 5288, 5290, 5292, 5294, 5296, 5298,
5300, 5302, 5304, 5306, 5308, 5310, 5312, 5314, 5316, 5318, 5320, 5322, 5324,
5326, 5328, 5330, 5332, 5334, 5336, 5338, 5340, 5342, 5344, 5346, 5348, 5350,
5352, 5354, 5356, 5358, 5360, 5362, 5364, 5366, 5368, 5370, 5372, 5374, 5376,
5378, 5380, 5382, 5384, 5386, 5388, 5390, 5392, 5394, 5396, 5398, 5400, 5402,
5404, 5406, 5408, 5410, 5412, 5414, 5416, 5418, 5420, 5422, 5424, 5426, 5428,
5430, 5432, 5434, 5436, 5438, 5440, 5442, 5444, 5446, 5448, 5450, 5452, 5454,
5456, 5458, 5460, 5462, 5464, 5466, 5468, 5470, 5472, 5474, 5476, 5478, 5480,
5482, 5484, 5486, 5488, 5490, 5492, 5494, 5496, 5498, 5500, 5502, 5504, 5506,
5508, 5510, 5512, 5514, 5516, 5518, 5520, 5522, 5524, 5526, 5528, 5530, 5532,
5534, 5536, 5538, 5540, 5542, 5544, 5546, 5548, 5550, 5552, 5554, 5556, 5558,
5560, 5562, 5564, 5566, 5568, 5570, 5572, 5574, 5576, 5578, 5580, 5582, 5584,
5586, 5588, 5590, 5592, 5594, 5596, 5598, 5600, 5602, 5604, 5606, 5608, 5610,
5612, 5614, 5616, 5618, 5620, 5622, 5624, 5626, 5628, 5630, 5632, 5634, 5636,
5638, 5640, 5642, 5644, 5646, 5648, 5650, 5652, 5654, 5656, 5658, 5660, 5662,
5664, 5666, 5668, 5670, 5672, 5674, 5676, 5678, 5680, 5682, 5684, 5686, 5688,
5690, 5692, 5694, 5696, 5698, 5700, 5702, 5704, 5706, 5708, 5710, 5712, 5714,
5716, 5718, 5720, 5722, 5724, 5726, 5728, 5730, 5732, 5734, 5736, 5738, 5740,
5742, 5744, 5746, 5748, 5750, 5752, 5754, 5756, 5758, 5760, 5762, 5764, 5766,
5768, 5770, 5772, 5774, 5776, 5778, 5780, 5782, 5784, 5786, 5788, 5790, 5792,
5794, 5796, 5798, 5800, 5802, 5804, 5806, 5808, 5810, 5812, 5814, 5816, 5818,
5820, 5822, 5824, 5826, 5828, 5830, 5832, 5834, 5836, 5838, 5840, 5842, 5844,
5846, 5848, 5850, 5852, 5854, 5856, 5858, 5860, 5862, 5864, 5866, 5868, 5870,

5872, 5874, 5876, 5878, 5880, 5882, 5884, 5886, 5888, 5890, 5892, 5894, 5896,
5898, 5900, 5902, 5904, 5906, 5908, 5910, 5912, 5914, 5916, 5918, 5920, 5922,
5924, 5926, 5928, 5930, 5932, 5934, 5936, 5938, 5940, 5942, 5944, 5946, 5948,
5950, 5952, 5954, 5956, 5958, 5960, 5962, 5964, 5966, 5968, 5970, 5972, 5974,
5976, 5978, 5980, 5982, 5984, 5986, 5988, 5990, 5992, 5994, 5996, 5998, 6000,
6002, 6004, 6006, 6008, 6010, 6012, 6014, 6016, 6018, 6020, 6022, 6024, 6026,
6028, 6030, 6032, 6034, 6036, 6038, 6040, 6042, 6044, 6046, 6048, 6050, 6052,
6054, 6056, 6058, 6060, 6062, 6064, 6066, 6068, 6070, 6072, 6074, 6076, 6078,
6080, 6082, 6084, 6086, 6088, 6090, 6092, 6094, 6096, 6098, 6100, 6102, 6104,
6106, 6108, 6110, 6112, 6114, 6116, 6118, 6120, 6122, 6124, 6126, 6128, 6130,
6132, 6134, 6136, 6138, 6140, 6142, 6144, 6146, 6148, 6150, 6152, 6154, 6156,
6158, 6160, 6162, 6164, 6166, 6168, 6170, 6172, 6174, 6176, 6178, 6180, 6182,
6184, 6186, 6188, 6190, 6192, 6194, 6196, 6198, 6200, 6202, 6204, 6206, 6208,
6210, 6212, 6214, 6216, 6218, 6220, 6222, 6224, 6226, 6228, 6230, 6232, 6234,
6236, 6238, 6240, 6242, 6244, 6246, 6248, 6250, 6252, 6254, 6256, 6258, 6260,
6262, 6264, 6266, 6268, 6270, 6272, 6274, 6276, 6278, 6280, 6282, 6284, 6286,
6288, 6290, 6292, 6294, 6296, 6298, 6300, 6302, 6304, 6306, 6308, 6310, 6312,
6314, 6316, 6318, 6320, 6322, 6324, 6326, 6328, 6330, 6332, 6334, 6336, 6338,
6340, 6342, 6344, 6346, 6348, 6350, 6352, 6354, 6356, 6358, 6360, 6362, 6364,
6366, 6368, 6370, 6372, 6374, 6376, 6378, 6380, 6382, 6384, 6386, 6388, 6390,
6392, 6394, 6396, 6398, 6400, 6402, 6404, 6406, 6408, 6410, 6412, 6414, 6416,
6418, 6420, 6422, 6424, 6426, 6428, 6430, 6432, 6434, 6436, 6438, 6440, 6442,
6444, 6446, 6448, 6450, 6452, 6454, 6456, 6458, 6460, 6462, 6464, 6466, 6468,
6470, 6472, 6474, 6476, 6478, 6480, 6482, 6484, 6486, 6488, 6490, 6492, 6494,
6496, 6498, 6500, 6502, 6504, 6506, 6508, 6510, 6512, 6514, 6516, 6518, 6520,
6522, 6524, 6526, 6528, 6530, 6532, 6534, 6536, 6538, 6540, 6542, 6544, 6546,
6548, 6550, 6552, 6554, 6556, 6558, 6560, 6562, 6564, 6566, 6568, 6570, 6572,
6574, 6576, 6578, 6580, 6582, 6584, 6586, 6588, 6590, 6592, 6594, 6596, 6598,
6600, 6602, 6604, 6606, 6608, 6610, 6612, 6614, 6616, 6618, 6620, 6622, 6624,
6626, 6628, 6630, 6632, 6634, 6636, 6638, 6640, 6642, 6644, 6646, 6648, 6650,
6652, 6654, 6656, 6658, 6660, 6662, 6664, 6666, 6668, 6670, 6672, 6674, 6676,
6678, 6680, 6682, 6684, 6686, 6688, 6690, 6692, 6694, 6696, 6698, 6700, 6702,
6704, 6706, 6708, 6710, 6712, 6714, 6716, 6718, 6720, 6722, 6724, 6726, 6728,
6730, 6732, 6734, 6736, 6738, 6740, 6742, 6744, 6746, 6748, 6750, 6752, 6754,
6756, 6758, 6760, 6762, 6764, 6766, 6768, 6770, 6772, 6774, 6776, 6778, 6780,
6782, 6784, 6786, 6788, 6790, 6792, 6794, 6796, 6798, 6800, 6802, 6804, 6806,
6808, 6810, 6812, 6814, 6816, 6818, 6820, 6822, 6824, 6826, 6828, 6830, 6832,
6834, 6836, 6838, 6840, 6842, 6844, 6846, 6848, 6850, 6852, 6854, 6856, 6858,
6860, 6862, 6864, 6866, 6868, 6870, 6872, 6874, 6876, 6878, 6880, 6882, 6884,
6886, 6888, 6890, 6892, 6894, 6896, 6898, 6900, 6902, 6904, 6906, 6908, 6910,
6912, 6914, 6916, 6918, 6920, 6922, 6924, 6926, 6928, 6930, 6932, 6934, 6936,
6938, 6940, 6942, 6944, 6946, 6948, 6950, 6952, 6954, 6956, 6958, 6960, 6962,
6964, 6966, 6968, 6970, 6972, 6974, 6976, 6978, 6980, 6982, 6984, 6986, 6988,
6990, 6992, 6994, 6996, 6998, 7000, 7002, 7004, 7006, 7008, 7010, 7012, 7014,
7016, 7018, 7020, 7022, 7024, 7026, 7028, 7030, 7032, 7034, 7036, 7038, 7040,
7042, 7044, 7046, 7048, 7050, 7052, 7054, 7056, 7058, 7060, 7062, 7064, 7066,
7068, 7070, 7072, 7074, 7076, 7078, 7080, 7082, 7084, 7086, 7088, 7090, 7092,
7094, 7096, 7098, 7100, 7102, 7104, 7106, 7108, 7110, 7112, 7114, 7116, 7118,
7120, 7122, 7124, 7126, 7128, 7130, 7132, 7134, 7136, 7138, 7140, 7142, 7144,
7146, 7148, 7150, 7152, 7154, 7156, 7158, 7160, 7162, 7164, 7166, 7168, 7170,
7172, 7174, 7176, 7178, 7180, 7182, 7184, 7186, 7188, 7190, 7192, 7194, 7196,
7198, 7200, 7202, 7204, 7206, 7208, 7210, 7212, 7214, 7216, 7218, 7220, 7222,
7224, 7226, 7228, 7230, 7232, 7234, 7236, 7238, 7240, 7242, 7244, 7246, 7248,
7250, 7252, 7254, 7256, 7258, 7260, 7262, 7264, 7266, 7268, 7270, 7272, 7274,
7276, 7278, 7280, 7282, 7284, 7286, 7288, 7290, 7292, 7294, 7296, 7298, 7300,

7302, 7304, 7306, 7308, 7310, 7312, 7314, 7316, 7318, 7320, 7322, 7324, 7326,
7328, 7330, 7332, 7334, 7336, 7338, 7340, 7342, 7344, 7346, 7348, 7350, 7352,
7354, 7356, 7358, 7360, 7362, 7364, 7366, 7368, 7370, 7372, 7374, 7376, 7378,
7380, 7382, 7384, 7386, 7388, 7390, 7392, 7394, 7396, 7398, 7400, 7402, 7404,
7406, 7408, 7410, 7412, 7414, 7416, 7418, 7420, 7422, 7424, 7426, 7428, 7430,
7432, 7434, 7436, 7438, 7440, 7442, 7444, 7446, 7448, 7450, 7452, 7454, 7456,
7458, 7460, 7462, 7464, 7466, 7468, 7470, 7472, 7474, 7476, 7478, 7480, 7482,
7484, 7486, 7488, 7490, 7492, 7494, 7496, 7498, 7500, 7502, 7504, 7506, 7508,
7510, 7512, 7514, 7516, 7518, 7520, 7522, 7524, 7526, 7528, 7530, 7532, 7534,
7536, 7538, 7540, 7542, 7544, 7546, 7548, 7550, 7552, 7554, 7556, 7558, 7560,
7562, 7564, 7566, 7568, 7570, 7572, 7574, 7576, 7578, 7580, 7582, 7584, 7586,
7588, 7590, 7592, 7594, 7596, 7598, 7600, 7602, 7604, 7606, 7608, 7610, 7612,
7614, 7616, 7618, 7620, 7622, 7624, 7626, 7628, 7630, 7632, 7634, 7636, 7638,
7640, 7642, 7644, 7646, 7648, 7650, 7652, 7654, 7656, 7658, 7660, 7662, 7664,
7666, 7668, 7670, 7672, 7674, 7676, 7678, 7680, 7682, 7684, 7686, 7688, 7690,
7692, 7694, 7696, 7698, 7700, 7702, 7704, 7706, 7708, 7710, 7712, 7714, 7716,
7718, 7720, 7722, 7724, 7726, 7728, 7730, 7732, 7734, 7736, 7738, 7740, 7742,
7744, 7746, 7748, 7750, 7752, 7754, 7756, 7758, 7760, 7762, 7764, 7766, 7768,
7770, 7772, 7774, 7776, 7778, 7780, 7782, 7784, 7786, 7788, 7790, 7792, 7794,
7796, 7798, 7800, 7802, 7804, 7806, 7808, 7810, 7812, 7814, 7816, 7818, 7820,
7822, 7824, 7826, 7828, 7830, 7832, 7834, 7836, 7838, 7840, 7842, 7844, 7846,
7848, 7850, 7852, 7854, 7856, 7858, 7860, 7862, 7864, 7866, 7868, 7870, 7872,
7874, 7876, 7878, 7880, 7882, 7884, 7886, 7888, 7890, 7892, 7894, 7896, 7898,
7900, 7902, 7904, 7906, 7908, 7910, 7912, 7914, 7916, 7918, 7920, 7922, 7924,
7926, 7928, 7930, 7932, 7934, 7936, 7938, 7940, 7942, 7944, 7946, 7948, 7950,
7952, 7954, 7956, 7958, 7960, 7962, 7964, 7966, 7968, 7970, 7972, 7974, 7976,
7978, 7980, 7982, 7984, 7986, 7988, 7990, 7992, 7994, 7996, 7998, 8000, 8002,
8004, 8006, 8008, 8010, 8012, 8014, 8016, 8018, 8020, 8022, 8024, 8026, 8028,
8030, 8032, 8034, 8036, 8038, 8040, 8042, 8044, 8046, 8048, 8050, 8052, 8054,
8056, 8058, 8060, 8062, 8064, 8066, 8068, 8070, 8072, 8074, 8076, 8078, 8080,
8082, 8084, 8086, 8088, 8090, 8092, 8094, 8096, 8098, 8100, 8102, 8104, 8106,
8108, 8110, 8112, 8114, 8116, 8118, 8120, 8122, 8124, 8126, 8128, 8130, 8132,
8134, 8136, 8138, 8140, 8142, 8144, 8146, 8148, 8150, 8152, 8154, 8156, 8158,
8160, 8162, 8164, 8166, 8168, 8170, 8172, 8174, 8176, 8178, 8180, 8182, 8184,
8186, 8188, 8190, 8192, 8194, 8196, 8198, 8200, 8202, 8204, 8206, 8208, 8210,
8212, 8214, 8216, 8218, 8220, 8222, 8224, 8226, 8228, 8230, 8232, 8234, 8236,
8238, 8240, 8242, 8244, 8246, 8248, 8250, 8252, 8254, 8256, 8258, 8260, 8262,
8264, 8266, 8268, 8270, 8272, 8274, 8276, 8278, 8280, 8282, 8284, 8286, 8288,
8290, 8292, 8294, 8296, 8298, 8300, 8302, 8304, 8306, 8308, 8310, 8312, 8314,
8316, 8318, 8320, 8322, 8324, 8326, 8328, 8330, 8332, 8334, 8336, 8338, 8340,
8342, 8344, 8346, 8348, 8350, 8352, 8354, 8356, 8358, 8360, 8362, 8364, 8366,
8368, 8370, 8372, 8374, 8376, 8378, 8380, 8382, 8384, 8386, 8388, 8390, 8392,
8394, 8396, 8398, 8400, 8402, 8404, 8406, 8408, 8410, 8412, 8414, 8416, 8418,
8420, 8422, 8424, 8426, 8428, 8430, 8432, 8434, 8436, 8438, 8440, 8442, 8444,
8446, 8448, 8450, 8452, 8454, 8456, 8458, 8460, 8462, 8464, 8466, 8468, 8470,
8472, 8474, 8476, 8478, 8480, 8482, 8484, 8486, 8488, 8490, 8492, 8494, 8496,
8498, 8500, 8502, 8504, 8506, 8508, 8510, 8512, 8514, 8516, 8518, 8520, 8522,
8524, 8526, 8528, 8530, 8532, 8534, 8536, 8538, 8540, 8542, 8544, 8546, 8548,
8550, 8552, 8554, 8556, 8558, 8560, 8562, 8564, 8566, 8568, 8570, 8572, 8574,
8576, 8578, 8580, 8582, 8584, 8586, 8588, 8590, 8592, 8594, 8596, 8598, 8600,
8602, 8604, 8606, 8608, 8610, 8612, 8614, 8616, 8618, 8620, 8622, 8624, 8626,
8628, 8630, 8632, 8634, 8636, 8638, 8640, 8642, 8644, 8646, 8648, 8650, 8652,
8654, 8656, 8658, 8660, 8662, 8664, 8666, 8668, 8670, 8672, 8674, 8676, 8678,
8680, 8682, 8684, 8686, 8688, 8690, 8692, 8694, 8696, 8698, 8700, 8702, 8704,
8706, 8708, 8710, 8712, 8714, 8716, 8718, 8720, 8722, 8724, 8726, 8728, 8730,

8732, 8734, 8736, 8738, 8740, 8742, 8744, 8746, 8748, 8750, 8752, 8754, 8756,
8758, 8760, 8762, 8764, 8766, 8768, 8770, 8772, 8774, 8776, 8778, 8780, 8782,
8784, 8786, 8788, 8790, 8792, 8794, 8796, 8798, 8800, 8802, 8804, 8806, 8808,
8810, 8812, 8814, 8816, 8818, 8820, 8822, 8824, 8826, 8828, 8830, 8832, 8834,
8836, 8838, 8840, 8842, 8844, 8846, 8848, 8850, 8852, 8854, 8856, 8858, 8860,
8862, 8864, 8866, 8868, 8870, 8872, 8874, 8876, 8878, 8880, 8882, 8884, 8886,
8888, 8890, 8892, 8894, 8896, 8898, 8900, 8902, 8904, 8906, 8908, 8910, 8912,
8914, 8916, 8918, 8920, 8922, 8924, 8926, 8928, 8930, 8932, 8934, 8936, 8938,
8940, 8942, 8944, 8946, 8948, 8950, 8952, 8954, 8956, 8958, 8960, 8962, 8964,
8966, 8968, 8970, 8972, 8974, 8976, 8978, 8980, 8982, 8984, 8986, 8988, 8990,
8992, 8994, 8996, 8998, 9000, 9002, 9004, 9006, 9008, 9010, 9012, 9014, 9016,
9018, 9020, 9022, 9024, 9026, 9028, 9030, 9032, 9034, 9036, 9038, 9040, 9042,
9044, 9046, 9048, 9050, 9052, 9054, 9056, 9058, 9060, 9062, 9064, 9066, 9068,
9070, 9072, 9074, 9076, 9078, 9080, 9082, 9084, 9086, 9088, 9090, 9092, 9094,
9096, 9098, 9100, 9102, 9104, 9106, 9108, 9110, 9112, 9114, 9116, 9118, 9120,
9122, 9124, 9126, 9128, 9130, 9132, 9134, 9136, 9138, 9140, 9142, 9144, 9146,
9148, 9150, 9152, 9154, 9156, 9158, 9160, 9162, 9164, 9166, 9168, 9170, 9172,
9174, 9176, 9178, 9180, 9182, 9184, 9186, 9188, 9190, 9192, 9194, 9196, 9198,
9200, 9202, 9204, 9206, 9208, 9210, 9212, 9214, 9216, 9218, 9220, 9222, 9224,
9226, 9228, 9230, 9232, 9234, 9236, 9238, 9240, 9242, 9244, 9246, 9248, 9250,
9252, 9254, 9256, 9258, 9260, 9262, 9264, 9266, 9268, 9270, 9272, 9274, 9276,
9278, 9280, 9282, 9284, 9286, 9288, 9290, 9292, 9294, 9296, 9298, 9300, 9302,
9304, 9306, 9308, 9310, 9312, 9314, 9316, 9318, 9320, 9322, 9324, 9326, 9328,
9330, 9332, 9334, 9336, 9338, 9340, 9342, 9344, 9346, 9348, 9350, 9352, 9354,
9356, 9358, 9360, 9362, 9364, 9366, 9368, 9370, 9372, 9374, 9376, 9378, 9380,
9382, 9384, 9386, 9388, 9390, 9392, 9394, 9396, 9398, 9400, 9402, 9404, 9406,
9408, 9410, 9412, 9414, 9416, 9418, 9420, 9422, 9424, 9426, 9428, 9430, 9432,
9434, 9436, 9438, 9440, 9442, 9444, 9446, 9448, 9450, 9452, 9454, 9456, 9458,
9460, 9462, 9464, 9466, 9468, 9470, 9472, 9474, 9476, 9478, 9480, 9482, 9484,
9486, 9488, 9490, 9492, 9494, 9496, 9498, 9500, 9502, 9504, 9506, 9508, 9510,
9512, 9514, 9516, 9518, 9520, 9522, 9524, 9526, 9528, 9530, 9532, 9534, 9536,
9538, 9540, 9542, 9544, 9546, 9548, 9550, 9552, 9554, 9556, 9558, 9560, 9562,
9564, 9566, 9568, 9570, 9572, 9574, 9576, 9578, 9580, 9582, 9584, 9586, 9588,
9590, 9592, 9594, 9596, 9598, 9600, 9602, 9604, 9606, 9608, 9610, 9612, 9614,
9616, 9618, 9620, 9622, 9624, 9626, 9628, 9630, 9632, 9634, 9636, 9638, 9640,
9642, 9644, 9646, 9648, 9650, 9652, 9654, 9656, 9658, 9660, 9662, 9664, 9666,
9668, 9670, 9672, 9674, 9676, 9678, 9680, 9682, 9684, 9686, 9688, 9690, 9692,
9694, 9696, 9698, 9700, 9702, 9704, 9706, 9708, 9710, 9712, 9714, 9716, 9718,
9720, 9722, 9724, 9726, 9728, 9730, 9732, 9734, 9736, 9738, 9740, 9742, 9744,
9746, 9748, 9750, 9752, 9754, 9756, 9758, 9760, 9762, 9764, 9766, 9768, 9770,
9772, 9774, 9776, 9778, 9780, 9782, 9784, 9786, 9788, 9790, 9792, 9794, 9796,
9798, 9800, 9802, 9804, 9806, 9808, 9810, 9812, 9814, 9816, 9818, 9820, 9822,
9824, 9826, 9828, 9830, 9832, 9834, 9836, 9838, 9840, 9842, 9844, 9846, 9848,
9850, 9852, 9854, 9856, 9858, 9860, 9862, 9864, 9866, 9868, 9870, 9872, 9874,
9876, 9878, 9880, 9882, 9884, 9886, 9888, 9890, 9892, 9894, 9896, 9898, 9900,
9902, 9904, 9906, 9908, 9910, 9912, 9914, 9916, 9918, 9920, 9922, 9924, 9926,
9928, 9930, 9932, 9934, 9936, 9938, 9940, 9942, 9944, 9946, 9948, 9950, 9952,
9954, 9956, 9958, 9960, 9962, 9964, 9966, 9968, 9970, 9972, 9974, 9976, 9978,
9980, 9982, 9984, 9986, 9988, 9990, 9992, 9994, 9996, 9998]

[1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581,

1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607,
1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633,
1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659,
1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685,
1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711,
1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737,
1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763,
1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789,
1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815,
1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841,
1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867,
1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893,
1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919,
1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945,
1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971,
1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997,
1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023,
2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049,
2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075,
2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101,
2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127,
2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153,
2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179,
2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205,
2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231,
2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257,
2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283,
2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309,
2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335,
2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361,
2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387,
2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413,
2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439,
2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465,
2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491,
2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517,
2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543,
2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569,
2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595,
2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621,
2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647,
2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673,
2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699,
2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725,
2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751,
2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777,
2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803,
2805, 2807, 2809, 2811, 2813, 2815, 2817, 2819, 2821, 2823, 2825, 2827, 2829,
2831, 2833, 2835, 2837, 2839, 2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855,
2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881,
2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907,
2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933,
2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959,
2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985,
2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011,

3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037,
3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063,
3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089,
3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115,
3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141,
3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167,
3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193,
3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219,
3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245,
3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271,
3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297,
3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323,
3325, 3327, 3329, 3331, 3333, 3335, 3337, 3339, 3341, 3343, 3345, 3347, 3349,
3351, 3353, 3355, 3357, 3359, 3361, 3363, 3365, 3367, 3369, 3371, 3373, 3375,
3377, 3379, 3381, 3383, 3385, 3387, 3389, 3391, 3393, 3395, 3397, 3399, 3401,
3403, 3405, 3407, 3409, 3411, 3413, 3415, 3417, 3419, 3421, 3423, 3425, 3427,
3429, 3431, 3433, 3435, 3437, 3439, 3441, 3443, 3445, 3447, 3449, 3451, 3453,
3455, 3457, 3459, 3461, 3463, 3465, 3467, 3469, 3471, 3473, 3475, 3477, 3479,
3481, 3483, 3485, 3487, 3489, 3491, 3493, 3495, 3497, 3499, 3501, 3503, 3505,
3507, 3509, 3511, 3513, 3515, 3517, 3519, 3521, 3523, 3525, 3527, 3529, 3531,
3533, 3535, 3537, 3539, 3541, 3543, 3545, 3547, 3549, 3551, 3553, 3555, 3557,
3559, 3561, 3563, 3565, 3567, 3569, 3571, 3573, 3575, 3577, 3579, 3581, 3583,
3585, 3587, 3589, 3591, 3593, 3595, 3597, 3599, 3601, 3603, 3605, 3607, 3609,
3611, 3613, 3615, 3617, 3619, 3621, 3623, 3625, 3627, 3629, 3631, 3633, 3635,
3637, 3639, 3641, 3643, 3645, 3647, 3649, 3651, 3653, 3655, 3657, 3659, 3661,
3663, 3665, 3667, 3669, 3671, 3673, 3675, 3677, 3679, 3681, 3683, 3685, 3687,
3689, 3691, 3693, 3695, 3697, 3699, 3701, 3703, 3705, 3707, 3709, 3711, 3713,
3715, 3717, 3719, 3721, 3723, 3725, 3727, 3729, 3731, 3733, 3735, 3737, 3739,
3741, 3743, 3745, 3747, 3749, 3751, 3753, 3755, 3757, 3759, 3761, 3763, 3765,
3767, 3769, 3771, 3773, 3775, 3777, 3779, 3781, 3783, 3785, 3787, 3789, 3791,
3793, 3795, 3797, 3799, 3801, 3803, 3805, 3807, 3809, 3811, 3813, 3815, 3817,
3819, 3821, 3823, 3825, 3827, 3829, 3831, 3833, 3835, 3837, 3839, 3841, 3843,
3845, 3847, 3849, 3851, 3853, 3855, 3857, 3859, 3861, 3863, 3865, 3867, 3869,
3871, 3873, 3875, 3877, 3879, 3881, 3883, 3885, 3887, 3889, 3891, 3893, 3895,
3897, 3899, 3901, 3903, 3905, 3907, 3909, 3911, 3913, 3915, 3917, 3919, 3921,
3923, 3925, 3927, 3929, 3931, 3933, 3935, 3937, 3939, 3941, 3943, 3945, 3947,
3949, 3951, 3953, 3955, 3957, 3959, 3961, 3963, 3965, 3967, 3969, 3971, 3973,
3975, 3977, 3979, 3981, 3983, 3985, 3987, 3989, 3991, 3993, 3995, 3997, 3999,
4001, 4003, 4005, 4007, 4009, 4011, 4013, 4015, 4017, 4019, 4021, 4023, 4025,
4027, 4029, 4031, 4033, 4035, 4037, 4039, 4041, 4043, 4045, 4047, 4049, 4051,
4053, 4055, 4057, 4059, 4061, 4063, 4065, 4067, 4069, 4071, 4073, 4075, 4077,
4079, 4081, 4083, 4085, 4087, 4089, 4091, 4093, 4095, 4097, 4099, 4101, 4103,
4105, 4107, 4109, 4111, 4113, 4115, 4117, 4119, 4121, 4123, 4125, 4127, 4129,
4131, 4133, 4135, 4137, 4139, 4141, 4143, 4145, 4147, 4149, 4151, 4153, 4155,
4157, 4159, 4161, 4163, 4165, 4167, 4169, 4171, 4173, 4175, 4177, 4179, 4181,
4183, 4185, 4187, 4189, 4191, 4193, 4195, 4197, 4199, 4201, 4203, 4205, 4207,
4209, 4211, 4213, 4215, 4217, 4219, 4221, 4223, 4225, 4227, 4229, 4231, 4233,
4235, 4237, 4239, 4241, 4243, 4245, 4247, 4249, 4251, 4253, 4255, 4257, 4259,
4261, 4263, 4265, 4267, 4269, 4271, 4273, 4275, 4277, 4279, 4281, 4283, 4285,
4287, 4289, 4291, 4293, 4295, 4297, 4299, 4301, 4303, 4305, 4307, 4309, 4311,
4313, 4315, 4317, 4319, 4321, 4323, 4325, 4327, 4329, 4331, 4333, 4335, 4337,
4339, 4341, 4343, 4345, 4347, 4349, 4351, 4353, 4355, 4357, 4359, 4361, 4363,
4365, 4367, 4369, 4371, 4373, 4375, 4377, 4379, 4381, 4383, 4385, 4387, 4389,
4391, 4393, 4395, 4397, 4399, 4401, 4403, 4405, 4407, 4409, 4411, 4413, 4415,
4417, 4419, 4421, 4423, 4425, 4427, 4429, 4431, 4433, 4435, 4437, 4439, 4441,

4443, 4445, 4447, 4449, 4451, 4453, 4455, 4457, 4459, 4461, 4463, 4465, 4467,
4469, 4471, 4473, 4475, 4477, 4479, 4481, 4483, 4485, 4487, 4489, 4491, 4493,
4495, 4497, 4499, 4501, 4503, 4505, 4507, 4509, 4511, 4513, 4515, 4517, 4519,
4521, 4523, 4525, 4527, 4529, 4531, 4533, 4535, 4537, 4539, 4541, 4543, 4545,
4547, 4549, 4551, 4553, 4555, 4557, 4559, 4561, 4563, 4565, 4567, 4569, 4571,
4573, 4575, 4577, 4579, 4581, 4583, 4585, 4587, 4589, 4591, 4593, 4595, 4597,
4599, 4601, 4603, 4605, 4607, 4609, 4611, 4613, 4615, 4617, 4619, 4621, 4623,
4625, 4627, 4629, 4631, 4633, 4635, 4637, 4639, 4641, 4643, 4645, 4647, 4649,
4651, 4653, 4655, 4657, 4659, 4661, 4663, 4665, 4667, 4669, 4671, 4673, 4675,
4677, 4679, 4681, 4683, 4685, 4687, 4689, 4691, 4693, 4695, 4697, 4699, 4701,
4703, 4705, 4707, 4709, 4711, 4713, 4715, 4717, 4719, 4721, 4723, 4725, 4727,
4729, 4731, 4733, 4735, 4737, 4739, 4741, 4743, 4745, 4747, 4749, 4751, 4753,
4755, 4757, 4759, 4761, 4763, 4765, 4767, 4769, 4771, 4773, 4775, 4777, 4779,
4781, 4783, 4785, 4787, 4789, 4791, 4793, 4795, 4797, 4799, 4801, 4803, 4805,
4807, 4809, 4811, 4813, 4815, 4817, 4819, 4821, 4823, 4825, 4827, 4829, 4831,
4833, 4835, 4837, 4839, 4841, 4843, 4845, 4847, 4849, 4851, 4853, 4855, 4857,
4859, 4861, 4863, 4865, 4867, 4869, 4871, 4873, 4875, 4877, 4879, 4881, 4883,
4885, 4887, 4889, 4891, 4893, 4895, 4897, 4899, 4901, 4903, 4905, 4907, 4909,
4911, 4913, 4915, 4917, 4919, 4921, 4923, 4925, 4927, 4929, 4931, 4933, 4935,
4937, 4939, 4941, 4943, 4945, 4947, 4949, 4951, 4953, 4955, 4957, 4959, 4961,
4963, 4965, 4967, 4969, 4971, 4973, 4975, 4977, 4979, 4981, 4983, 4985, 4987,
4989, 4991, 4993, 4995, 4997, 4999, 5001, 5003, 5005, 5007, 5009, 5011, 5013,
5015, 5017, 5019, 5021, 5023, 5025, 5027, 5029, 5031, 5033, 5035, 5037, 5039,
5041, 5043, 5045, 5047, 5049, 5051, 5053, 5055, 5057, 5059, 5061, 5063, 5065,
5067, 5069, 5071, 5073, 5075, 5077, 5079, 5081, 5083, 5085, 5087, 5089, 5091,
5093, 5095, 5097, 5099, 5101, 5103, 5105, 5107, 5109, 5111, 5113, 5115, 5117,
5119, 5121, 5123, 5125, 5127, 5129, 5131, 5133, 5135, 5137, 5139, 5141, 5143,
5145, 5147, 5149, 5151, 5153, 5155, 5157, 5159, 5161, 5163, 5165, 5167, 5169,
5171, 5173, 5175, 5177, 5179, 5181, 5183, 5185, 5187, 5189, 5191, 5193, 5195,
5197, 5199, 5201, 5203, 5205, 5207, 5209, 5211, 5213, 5215, 5217, 5219, 5221,
5223, 5225, 5227, 5229, 5231, 5233, 5235, 5237, 5239, 5241, 5243, 5245, 5247,
5249, 5251, 5253, 5255, 5257, 5259, 5261, 5263, 5265, 5267, 5269, 5271, 5273,
5275, 5277, 5279, 5281, 5283, 5285, 5287, 5289, 5291, 5293, 5295, 5297, 5299,
5301, 5303, 5305, 5307, 5309, 5311, 5313, 5315, 5317, 5319, 5321, 5323, 5325,
5327, 5329, 5331, 5333, 5335, 5337, 5339, 5341, 5343, 5345, 5347, 5349, 5351,
5353, 5355, 5357, 5359, 5361, 5363, 5365, 5367, 5369, 5371, 5373, 5375, 5377,
5379, 5381, 5383, 5385, 5387, 5389, 5391, 5393, 5395, 5397, 5399, 5401, 5403,
5405, 5407, 5409, 5411, 5413, 5415, 5417, 5419, 5421, 5423, 5425, 5427, 5429,
5431, 5433, 5435, 5437, 5439, 5441, 5443, 5445, 5447, 5449, 5451, 5453, 5455,
5457, 5459, 5461, 5463, 5465, 5467, 5469, 5471, 5473, 5475, 5477, 5479, 5481,
5483, 5485, 5487, 5489, 5491, 5493, 5495, 5497, 5499, 5501, 5503, 5505, 5507,
5509, 5511, 5513, 5515, 5517, 5519, 5521, 5523, 5525, 5527, 5529, 5531, 5533,
5535, 5537, 5539, 5541, 5543, 5545, 5547, 5549, 5551, 5553, 5555, 5557, 5559,
5561, 5563, 5565, 5567, 5569, 5571, 5573, 5575, 5577, 5579, 5581, 5583, 5585,
5587, 5589, 5591, 5593, 5595, 5597, 5599, 5601, 5603, 5605, 5607, 5609, 5611,
5613, 5615, 5617, 5619, 5621, 5623, 5625, 5627, 5629, 5631, 5633, 5635, 5637,
5639, 5641, 5643, 5645, 5647, 5649, 5651, 5653, 5655, 5657, 5659, 5661, 5663,
5665, 5667, 5669, 5671, 5673, 5675, 5677, 5679, 5681, 5683, 5685, 5687, 5689,
5691, 5693, 5695, 5697, 5699, 5701, 5703, 5705, 5707, 5709, 5711, 5713, 5715,
5717, 5719, 5721, 5723, 5725, 5727, 5729, 5731, 5733, 5735, 5737, 5739, 5741,
5743, 5745, 5747, 5749, 5751, 5753, 5755, 5757, 5759, 5761, 5763, 5765, 5767,
5769, 5771, 5773, 5775, 5777, 5779, 5781, 5783, 5785, 5787, 5789, 5791, 5793,
5795, 5797, 5799, 5801, 5803, 5805, 5807, 5809, 5811, 5813, 5815, 5817, 5819,
5821, 5823, 5825, 5827, 5829, 5831, 5833, 5835, 5837, 5839, 5841, 5843, 5845,
5847, 5849, 5851, 5853, 5855, 5857, 5859, 5861, 5863, 5865, 5867, 5869, 5871,

5873, 5875, 5877, 5879, 5881, 5883, 5885, 5887, 5889, 5891, 5893, 5895, 5897, 5899, 5901, 5903, 5905, 5907, 5909, 5911, 5913, 5915, 5917, 5919, 5921, 5923, 5925, 5927, 5929, 5931, 5933, 5935, 5937, 5939, 5941, 5943, 5945, 5947, 5949, 5951, 5953, 5955, 5957, 5959, 5961, 5963, 5965, 5967, 5969, 5971, 5973, 5975, 5977, 5979, 5981, 5983, 5985, 5987, 5989, 5991, 5993, 5995, 5997, 5999, 6001, 6003, 6005, 6007, 6009, 6011, 6013, 6015, 6017, 6019, 6021, 6023, 6025, 6027, 6029, 6031, 6033, 6035, 6037, 6039, 6041, 6043, 6045, 6047, 6049, 6051, 6053, 6055, 6057, 6059, 6061, 6063, 6065, 6067, 6069, 6071, 6073, 6075, 6077, 6079, 6081, 6083, 6085, 6087, 6089, 6091, 6093, 6095, 6097, 6099, 6101, 6103, 6105, 6107, 6109, 6111, 6113, 6115, 6117, 6119, 6121, 6123, 6125, 6127, 6129, 6131, 6133, 6135, 6137, 6139, 6141, 6143, 6145, 6147, 6149, 6151, 6153, 6155, 6157, 6159, 6161, 6163, 6165, 6167, 6169, 6171, 6173, 6175, 6177, 6179, 6181, 6183, 6185, 6187, 6189, 6191, 6193, 6195, 6197, 6199, 6201, 6203, 6205, 6207, 6209, 6211, 6213, 6215, 6217, 6219, 6221, 6223, 6225, 6227, 6229, 6231, 6233, 6235, 6237, 6239, 6241, 6243, 6245, 6247, 6249, 6251, 6253, 6255, 6257, 6259, 6261, 6263, 6265, 6267, 6269, 6271, 6273, 6275, 6277, 6279, 6281, 6283, 6285, 6287, 6289, 6291, 6293, 6295, 6297, 6299, 6301, 6303, 6305, 6307, 6309, 6311, 6313, 6315, 6317, 6319, 6321, 6323, 6325, 6327, 6329, 6331, 6333, 6335, 6337, 6339, 6341, 6343, 6345, 6347, 6349, 6351, 6353, 6355, 6357, 6359, 6361, 6363, 6365, 6367, 6369, 6371, 6373, 6375, 6377, 6379, 6381, 6383, 6385, 6387, 6389, 6391, 6393, 6395, 6397, 6399, 6401, 6403, 6405, 6407, 6409, 6411, 6413, 6415, 6417, 6419, 6421, 6423, 6425, 6427, 6429, 6431, 6433, 6435, 6437, 6439, 6441, 6443, 6445, 6447, 6449, 6451, 6453, 6455, 6457, 6459, 6461, 6463, 6465, 6467, 6469, 6471, 6473, 6475, 6477, 6479, 6481, 6483, 6485, 6487, 6489, 6491, 6493, 6495, 6497, 6499, 6501, 6503, 6505, 6507, 6509, 6511, 6513, 6515, 6517, 6519, 6521, 6523, 6525, 6527, 6529, 6531, 6533, 6535, 6537, 6539, 6541, 6543, 6545, 6547, 6549, 6551, 6553, 6555, 6557, 6559, 6561, 6563, 6565, 6567, 6569, 6571, 6573, 6575, 6577, 6579, 6581, 6583, 6585, 6587, 6589, 6591, 6593, 6595, 6597, 6599, 6601, 6603, 6605, 6607, 6609, 6611, 6613, 6615, 6617, 6619, 6621, 6623, 6625, 6627, 6629, 6631, 6633, 6635, 6637, 6639, 6641, 6643, 6645, 6647, 6649, 6651, 6653, 6655, 6657, 6659, 6661, 6663, 6665, 6667, 6669, 6671, 6673, 6675, 6677, 6679, 6681, 6683, 6685, 6687, 6689, 6691, 6693, 6695, 6697, 6699, 6701, 6703, 6705, 6707, 6709, 6711, 6713, 6715, 6717, 6719, 6721, 6723, 6725, 6727, 6729, 6731, 6733, 6735, 6737, 6739, 6741, 6743, 6745, 6747, 6749, 6751, 6753, 6755, 6757, 6759, 6761, 6763, 6765, 6767, 6769, 6771, 6773, 6775, 6777, 6779, 6781, 6783, 6785, 6787, 6789, 6791, 6793, 6795, 6797, 6799, 6801, 6803, 6805, 6807, 6809, 6811, 6813, 6815, 6817, 6819, 6821, 6823, 6825, 6827, 6829, 6831, 6833, 6835, 6837, 6839, 6841, 6843, 6845, 6847, 6849, 6851, 6853, 6855, 6857, 6859, 6861, 6863, 6865, 6867, 6869, 6871, 6873, 6875, 6877, 6879, 6881, 6883, 6885, 6887, 6889, 6891, 6893, 6895, 6897, 6899, 6901, 6903, 6905, 6907, 6909, 6911, 6913, 6915, 6917, 6919, 6921, 6923, 6925, 6927, 6929, 6931, 6933, 6935, 6937, 6939, 6941, 6943, 6945, 6947, 6949, 6951, 6953, 6955, 6957, 6959, 6961, 6963, 6965, 6967, 6969, 6971, 6973, 6975, 6977, 6979, 6981, 6983, 6985, 6987, 6989, 6991, 6993, 6995, 6997, 6999, 7001, 7003, 7005, 7007, 7009, 7011, 7013, 7015, 7017, 7019, 7021, 7023, 7025, 7027, 7029, 7031, 7033, 7035, 7037, 7039, 7041, 7043, 7045, 7047, 7049, 7051, 7053, 7055, 7057, 7059, 7061, 7063, 7065, 7067, 7069, 7071, 7073, 7075, 7077, 7079, 7081, 7083, 7085, 7087, 7089, 7091, 7093, 7095, 7097, 7099, 7101, 7103, 7105, 7107, 7109, 7111, 7113, 7115, 7117, 7119, 7121, 7123, 7125, 7127, 7129, 7131, 7133, 7135, 7137, 7139, 7141, 7143, 7145, 7147, 7149, 7151, 7153, 7155, 7157, 7159, 7161, 7163, 7165, 7167, 7169, 7171, 7173, 7175, 7177, 7179, 7181, 7183, 7185, 7187, 7189, 7191, 7193, 7195, 7197, 7199, 7201, 7203, 7205, 7207, 7209, 7211, 7213, 7215, 7217, 7219, 7221, 7223, 7225, 7227, 7229, 7231, 7233, 7235, 7237, 7239, 7241, 7243, 7245, 7247, 7249, 7251, 7253, 7255, 7257, 7259, 7261, 7263, 7265, 7267, 7269, 7271, 7273, 7275, 7277, 7279, 7281, 7283, 7285, 7287, 7289, 7291, 7293, 7295, 7297, 7299, 7301,

7303, 7305, 7307, 7309, 7311, 7313, 7315, 7317, 7319, 7321, 7323, 7325, 7327, 7329, 7331, 7333, 7335, 7337, 7339, 7341, 7343, 7345, 7347, 7349, 7351, 7353, 7355, 7357, 7359, 7361, 7363, 7365, 7367, 7369, 7371, 7373, 7375, 7377, 7379, 7381, 7383, 7385, 7387, 7389, 7391, 7393, 7395, 7397, 7399, 7401, 7403, 7405, 7407, 7409, 7411, 7413, 7415, 7417, 7419, 7421, 7423, 7425, 7427, 7429, 7431, 7433, 7435, 7437, 7439, 7441, 7443, 7445, 7447, 7449, 7451, 7453, 7455, 7457, 7459, 7461, 7463, 7465, 7467, 7469, 7471, 7473, 7475, 7477, 7479, 7481, 7483, 7485, 7487, 7489, 7491, 7493, 7495, 7497, 7499, 7501, 7503, 7505, 7507, 7509, 7511, 7513, 7515, 7517, 7519, 7521, 7523, 7525, 7527, 7529, 7531, 7533, 7535, 7537, 7539, 7541, 7543, 7545, 7547, 7549, 7551, 7553, 7555, 7557, 7559, 7561, 7563, 7565, 7567, 7569, 7571, 7573, 7575, 7577, 7579, 7581, 7583, 7585, 7587, 7589, 7591, 7593, 7595, 7597, 7599, 7601, 7603, 7605, 7607, 7609, 7611, 7613, 7615, 7617, 7619, 7621, 7623, 7625, 7627, 7629, 7631, 7633, 7635, 7637, 7639, 7641, 7643, 7645, 7647, 7649, 7651, 7653, 7655, 7657, 7659, 7661, 7663, 7665, 7667, 7669, 7671, 7673, 7675, 7677, 7679, 7681, 7683, 7685, 7687, 7689, 7691, 7693, 7695, 7697, 7699, 7701, 7703, 7705, 7707, 7709, 7711, 7713, 7715, 7717, 7719, 7721, 7723, 7725, 7727, 7729, 7731, 7733, 7735, 7737, 7739, 7741, 7743, 7745, 7747, 7749, 7751, 7753, 7755, 7757, 7759, 7761, 7763, 7765, 7767, 7769, 7771, 7773, 7775, 7777, 7779, 7781, 7783, 7785, 7787, 7789, 7791, 7793, 7795, 7797, 7799, 7801, 7803, 7805, 7807, 7809, 7811, 7813, 7815, 7817, 7819, 7821, 7823, 7825, 7827, 7829, 7831, 7833, 7835, 7837, 7839, 7841, 7843, 7845, 7847, 7849, 7851, 7853, 7855, 7857, 7859, 7861, 7863, 7865, 7867, 7869, 7871, 7873, 7875, 7877, 7879, 7881, 7883, 7885, 7887, 7889, 7891, 7893, 7895, 7897, 7899, 7901, 7903, 7905, 7907, 7909, 7911, 7913, 7915, 7917, 7919, 7921, 7923, 7925, 7927, 7929, 7931, 7933, 7935, 7937, 7939, 7941, 7943, 7945, 7947, 7949, 7951, 7953, 7955, 7957, 7959, 7961, 7963, 7965, 7967, 7969, 7971, 7973, 7975, 7977, 7979, 7981, 7983, 7985, 7987, 7989, 7991, 7993, 7995, 7997, 7999, 8001, 8003, 8005, 8007, 8009, 8011, 8013, 8015, 8017, 8019, 8021, 8023, 8025, 8027, 8029, 8031, 8033, 8035, 8037, 8039, 8041, 8043, 8045, 8047, 8049, 8051, 8053, 8055, 8057, 8059, 8061, 8063, 8065, 8067, 8069, 8071, 8073, 8075, 8077, 8079, 8081, 8083, 8085, 8087, 8089, 8091, 8093, 8095, 8097, 8099, 8101, 8103, 8105, 8107, 8109, 8111, 8113, 8115, 8117, 8119, 8121, 8123, 8125, 8127, 8129, 8131, 8133, 8135, 8137, 8139, 8141, 8143, 8145, 8147, 8149, 8151, 8153, 8155, 8157, 8159, 8161, 8163, 8165, 8167, 8169, 8171, 8173, 8175, 8177, 8179, 8181, 8183, 8185, 8187, 8189, 8191, 8193, 8195, 8197, 8199, 8201, 8203, 8205, 8207, 8209, 8211, 8213, 8215, 8217, 8219, 8221, 8223, 8225, 8227, 8229, 8231, 8233, 8235, 8237, 8239, 8241, 8243, 8245, 8247, 8249, 8251, 8253, 8255, 8257, 8259, 8261, 8263, 8265, 8267, 8269, 8271, 8273, 8275, 8277, 8279, 8281, 8283, 8285, 8287, 8289, 8291, 8293, 8295, 8297, 8299, 8301, 8303, 8305, 8307, 8309, 8311, 8313, 8315, 8317, 8319, 8321, 8323, 8325, 8327, 8329, 8331, 8333, 8335, 8337, 8339, 8341, 8343, 8345, 8347, 8349, 8351, 8353, 8355, 8357, 8359, 8361, 8363, 8365, 8367, 8369, 8371, 8373, 8375, 8377, 8379, 8381, 8383, 8385, 8387, 8389, 8391, 8393, 8395, 8397, 8399, 8401, 8403, 8405, 8407, 8409, 8411, 8413, 8415, 8417, 8419, 8421, 8423, 8425, 8427, 8429, 8431, 8433, 8435, 8437, 8439, 8441, 8443, 8445, 8447, 8449, 8451, 8453, 8455, 8457, 8459, 8461, 8463, 8465, 8467, 8469, 8471, 8473, 8475, 8477, 8479, 8481, 8483, 8485, 8487, 8489, 8491, 8493, 8495, 8497, 8499, 8501, 8503, 8505, 8507, 8509, 8511, 8513, 8515, 8517, 8519, 8521, 8523, 8525, 8527, 8529, 8531, 8533, 8535, 8537, 8539, 8541, 8543, 8545, 8547, 8549, 8551, 8553, 8555, 8557, 8559, 8561, 8563, 8565, 8567, 8569, 8571, 8573, 8575, 8577, 8579, 8581, 8583, 8585, 8587, 8589, 8591, 8593, 8595, 8597, 8599, 8601, 8603, 8605, 8607, 8609, 8611, 8613, 8615, 8617, 8619, 8621, 8623, 8625, 8627, 8629, 8631, 8633, 8635, 8637, 8639, 8641, 8643, 8645, 8647, 8649, 8651, 8653, 8655, 8657, 8659, 8661, 8663, 8665, 8667, 8669, 8671, 8673, 8675, 8677, 8679, 8681, 8683, 8685, 8687, 8689, 8691, 8693, 8695, 8697, 8699, 8701, 8703, 8705, 8707, 8709, 8711, 8713, 8715, 8717, 8719, 8721, 8723, 8725, 8727, 8729, 8731,

8733, 8735, 8737, 8739, 8741, 8743, 8745, 8747, 8749, 8751, 8753, 8755, 8757, 8759, 8761, 8763, 8765, 8767, 8769, 8771, 8773, 8775, 8777, 8779, 8781, 8783, 8785, 8787, 8789, 8791, 8793, 8795, 8797, 8799, 8801, 8803, 8805, 8807, 8809, 8811, 8813, 8815, 8817, 8819, 8821, 8823, 8825, 8827, 8829, 8831, 8833, 8835, 8837, 8839, 8841, 8843, 8845, 8847, 8849, 8851, 8853, 8855, 8857, 8859, 8861, 8863, 8865, 8867, 8869, 8871, 8873, 8875, 8877, 8879, 8881, 8883, 8885, 8887, 8889, 8891, 8893, 8895, 8897, 8899, 8901, 8903, 8905, 8907, 8909, 8911, 8913, 8915, 8917, 8919, 8921, 8923, 8925, 8927, 8929, 8931, 8933, 8935, 8937, 8939, 8941, 8943, 8945, 8947, 8949, 8951, 8953, 8955, 8957, 8959, 8961, 8963, 8965, 8967, 8969, 8971, 8973, 8975, 8977, 8979, 8981, 8983, 8985, 8987, 8989, 8991, 8993, 8995, 8997, 8999, 9001, 9003, 9005, 9007, 9009, 9011, 9013, 9015, 9017, 9019, 9021, 9023, 9025, 9027, 9029, 9031, 9033, 9035, 9037, 9039, 9041, 9043, 9045, 9047, 9049, 9051, 9053, 9055, 9057, 9059, 9061, 9063, 9065, 9067, 9069, 9071, 9073, 9075, 9077, 9079, 9081, 9083, 9085, 9087, 9089, 9091, 9093, 9095, 9097, 9099, 9101, 9103, 9105, 9107, 9109, 9111, 9113, 9115, 9117, 9119, 9121, 9123, 9125, 9127, 9129, 9131, 9133, 9135, 9137, 9139, 9141, 9143, 9145, 9147, 9149, 9151, 9153, 9155, 9157, 9159, 9161, 9163, 9165, 9167, 9169, 9171, 9173, 9175, 9177, 9179, 9181, 9183, 9185, 9187, 9189, 9191, 9193, 9195, 9197, 9199, 9201, 9203, 9205, 9207, 9209, 9211, 9213, 9215, 9217, 9219, 9221, 9223, 9225, 9227, 9229, 9231, 9233, 9235, 9237, 9239, 9241, 9243, 9245, 9247, 9249, 9251, 9253, 9255, 9257, 9259, 9261, 9263, 9265, 9267, 9269, 9271, 9273, 9275, 9277, 9279, 9281, 9283, 9285, 9287, 9289, 9291, 9293, 9295, 9297, 9299, 9301, 9303, 9305, 9307, 9309, 9311, 9313, 9315, 9317, 9319, 9321, 9323, 9325, 9327, 9329, 9331, 9333, 9335, 9337, 9339, 9341, 9343, 9345, 9347, 9349, 9351, 9353, 9355, 9357, 9359, 9361, 9363, 9365, 9367, 9369, 9371, 9373, 9375, 9377, 9379, 9381, 9383, 9385, 9387, 9389, 9391, 9393, 9395, 9397, 9399, 9401, 9403, 9405, 9407, 9409, 9411, 9413, 9415, 9417, 9419, 9421, 9423, 9425, 9427, 9429, 9431, 9433, 9435, 9437, 9439, 9441, 9443, 9445, 9447, 9449, 9451, 9453, 9455, 9457, 9459, 9461, 9463, 9465, 9467, 9469, 9471, 9473, 9475, 9477, 9479, 9481, 9483, 9485, 9487, 9489, 9491, 9493, 9495, 9497, 9499, 9501, 9503, 9505, 9507, 9509, 9511, 9513, 9515, 9517, 9519, 9521, 9523, 9525, 9527, 9529, 9531, 9533, 9535, 9537, 9539, 9541, 9543, 9545, 9547, 9549, 9551, 9553, 9555, 9557, 9559, 9561, 9563, 9565, 9567, 9569, 9571, 9573, 9575, 9577, 9579, 9581, 9583, 9585, 9587, 9589, 9591, 9593, 9595, 9597, 9599, 9601, 9603, 9605, 9607, 9609, 9611, 9613, 9615, 9617, 9619, 9621, 9623, 9625, 9627, 9629, 9631, 9633, 9635, 9637, 9639, 9641, 9643, 9645, 9647, 9649, 9651, 9653, 9655, 9657, 9659, 9661, 9663, 9665, 9667, 9669, 9671, 9673, 9675, 9677, 9679, 9681, 9683, 9685, 9687, 9689, 9691, 9693, 9695, 9697, 9699, 9701, 9703, 9705, 9707, 9709, 9711, 9713, 9715, 9717, 9719, 9721, 9723, 9725, 9727, 9729, 9731, 9733, 9735, 9737, 9739, 9741, 9743, 9745, 9747, 9749, 9751, 9753, 9755, 9757, 9759, 9761, 9763, 9765, 9767, 9769, 9771, 9773, 9775, 9777, 9779, 9781, 9783, 9785, 9787, 9789, 9791, 9793, 9795, 9797, 9799, 9801, 9803, 9805, 9807, 9809, 9811, 9813, 9815, 9817, 9819, 9821, 9823, 9825, 9827, 9829, 9831, 9833, 9835, 9837, 9839, 9841, 9843, 9845, 9847, 9849, 9851, 9853, 9855, 9857, 9859, 9861, 9863, 9865, 9867, 9869, 9871, 9873, 9875, 9877, 9879, 9881, 9883, 9885, 9887, 9889, 9891, 9893, 9895, 9897, 9899, 9901, 9903, 9905, 9907, 9909, 9911, 9913, 9915, 9917, 9919, 9921, 9923, 9925, 9927, 9929, 9931, 9933, 9935, 9937, 9939, 9941, 9943, 9945, 9947, 9949, 9951, 9953, 9955, 9957, 9959, 9961, 9963, 9965, 9967, 9969, 9971, 9973, 9975, 9977, 9979, 9981, 9983, 9985, 9987, 9989, 9991, 9993, 9995, 9997, 9999]

Output

Input 3

| | |
|---|---|
| 1 | [0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198] |
| 2 | [1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199] |
| 3 | 10 |

Output

| | |
|---|---|
| 1 | 9 |
|---|---|

Private Test case

Input 1

| | |
|---|-----------------|
| 1 | [1,1] |
| 2 | [1,1,1,1,1,1,1] |
| 3 | 5 |

Output

| | |
|---|---|
| 1 | 1 |
|---|---|

Input 2

[0, 2, 4, 6, 8, 10, 12, 14, 16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52, 54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90, 92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114, 116, 118, 120, 122, 124, 126, 128, 130, 132, 134, 136, 138, 140, 142, 144, 146, 148, 150, 152, 154, 156, 158, 160, 162, 164, 166, 168, 170, 172, 174, 176, 178, 180, 182, 184, 186, 188, 190, 192, 194, 196, 198, 200, 202, 204, 206, 208, 210, 212, 214, 216, 218, 220, 222, 224, 226, 228, 230, 232, 234, 236, 238, 240, 242, 244, 246, 248, 250, 252, 254, 256, 258, 260, 262, 264, 266, 268, 270, 272, 274, 276, 278, 280, 282, 284, 286, 288, 290, 292, 294, 296, 298, 300, 302, 304, 306, 308, 310, 312, 314, 316, 318, 320, 322, 324, 326, 328, 330, 332, 334, 336, 338, 340, 342, 344, 346, 348, 350, 352, 354, 356, 358, 360, 362, 364, 366, 368, 370, 372, 374, 376, 378, 380, 382, 384, 386, 388, 390, 392, 394, 396, 398, 400, 402, 404, 406, 408, 410, 412, 414, 416, 418, 420, 422, 424, 426, 428, 430, 432, 434, 436, 438, 440, 442, 444, 446, 448, 450, 452, 454, 456, 458, 460, 462, 464, 466, 468, 470, 472, 474, 476, 478, 480, 482, 484, 486, 488, 490, 492, 494, 496, 498, 500, 502, 504, 506, 508, 510, 512, 514, 516, 518, 520, 522, 524, 526, 528, 530, 532, 534, 536, 538, 540, 542, 544, 546, 548, 550, 552, 554, 556, 558, 560, 562, 564, 566, 568, 570, 572, 574, 576, 578, 580, 582, 584, 586, 588, 590, 592, 594, 596, 598, 600, 602, 604, 606, 608, 610, 612, 614, 616, 618, 620, 622, 624, 626, 628, 630, 632, 634, 636, 638, 640, 642, 644, 646, 648, 650, 652, 654, 656, 658, 660, 662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 682, 684, 686, 688, 690, 692, 694, 696, 698, 700, 702, 704, 706, 708, 710, 712, 714, 716, 718, 720, 722, 724, 726, 728, 730, 732, 734, 736, 738, 740, 742, 744, 746, 748, 750, 752, 754, 756, 758, 760, 762, 764, 766, 768, 770, 772, 774, 776, 778, 780, 782, 784, 786, 788, 790, 792, 794, 796, 798, 800, 802, 804, 806, 808, 810, 812, 814, 816, 818, 820, 822, 824, 826, 828, 830, 832, 834, 836, 838, 840, 842, 844, 846, 848, 850, 852, 854, 856, 858, 860, 862, 864, 866, 868, 870, 872, 874, 876, 878, 880, 882, 884, 886, 888, 890, 892, 894, 896, 898, 900, 902, 904, 906, 908, 910, 912, 914, 916, 918, 920, 922, 924, 926, 928, 930, 932, 934, 936, 938, 940, 942, 944, 946, 948, 950, 952, 954, 956, 958, 960, 962, 964, 966, 968, 970, 972, 974, 976, 978, 980, 982, 984, 986, 988, 990, 992, 994, 996, 998, 1000, 1002, 1004, 1006, 1008, 1010, 1012, 1014, 1016, 1018, 1020, 1022, 1024, 1026, 1028, 1030, 1032, 1034, 1036, 1038, 1040, 1042, 1044, 1046, 1048, 1050, 1052, 1054, 1056, 1058, 1060, 1062, 1064, 1066, 1068, 1070, 1072, 1074, 1076, 1078, 1080, 1082, 1084, 1086, 1088, 1090, 1092, 1094, 1096, 1098, 1100, 1102, 1104, 1106, 1108, 1110, 1112, 1114, 1116, 1118, 1120, 1122, 1124, 1126, 1128, 1130, 1132, 1134, 1136, 1138, 1140, 1142, 1144, 1146, 1148, 1150, 1152, 1154, 1156, 1158, 1160, 1162, 1164, 1166, 1168, 1170, 1172, 1174, 1176, 1178, 1180, 1182, 1184, 1186, 1188, 1190, 1192, 1194, 1196, 1198, 1200, 1202, 1204, 1206, 1208, 1210, 1212, 1214, 1216, 1218, 1220, 1222, 1224, 1226, 1228, 1230, 1232, 1234, 1236, 1238, 1240, 1242, 1244, 1246, 1248, 1250, 1252, 1254, 1256, 1258, 1260, 1262, 1264, 1266, 1268, 1270, 1272, 1274, 1276, 1278, 1280, 1282, 1284, 1286, 1288, 1290, 1292, 1294, 1296, 1298, 1300, 1302, 1304, 1306, 1308, 1310, 1312, 1314, 1316, 1318, 1320, 1322, 1324, 1326, 1328, 1330, 1332, 1334, 1336, 1338, 1340, 1342, 1344, 1346, 1348, 1350, 1352, 1354, 1356, 1358, 1360, 1362, 1364, 1366, 1368, 1370, 1372, 1374, 1376, 1378, 1380, 1382, 1384, 1386, 1388, 1390, 1392, 1394, 1396, 1398, 1400, 1402, 1404, 1406, 1408, 1410, 1412, 1414, 1416, 1418, 1420, 1422, 1424, 1426, 1428, 1430, 1432, 1434, 1436, 1438, 1440, 1442, 1444, 1446, 1448, 1450, 1452, 1454, 1456, 1458, 1460, 1462, 1464, 1466, 1468, 1470, 1472, 1474, 1476, 1478, 1480, 1482, 1484, 1486, 1488, 1490, 1492, 1494, 1496, 1498, 1500, 1502, 1504, 1506, 1508, 1510, 1512, 1514, 1516, 1518, 1520, 1522, 1524, 1526, 1528, 1530, 1532, 1534, 1536, 1538, 1540, 1542, 1544, 1546, 1548, 1550, 1552, 1554, 1556, 1558, 1560, 1562, 1564, 1566, 1568, 1570, 1572, 1574, 1576, 1578, 1580,

1582, 1584, 1586, 1588, 1590, 1592, 1594, 1596, 1598, 1600, 1602, 1604, 1606, 1608, 1610, 1612, 1614, 1616, 1618, 1620, 1622, 1624, 1626, 1628, 1630, 1632, 1634, 1636, 1638, 1640, 1642, 1644, 1646, 1648, 1650, 1652, 1654, 1656, 1658, 1660, 1662, 1664, 1666, 1668, 1670, 1672, 1674, 1676, 1678, 1680, 1682, 1684, 1686, 1688, 1690, 1692, 1694, 1696, 1698, 1700, 1702, 1704, 1706, 1708, 1710, 1712, 1714, 1716, 1718, 1720, 1722, 1724, 1726, 1728, 1730, 1732, 1734, 1736, 1738, 1740, 1742, 1744, 1746, 1748, 1750, 1752, 1754, 1756, 1758, 1760, 1762, 1764, 1766, 1768, 1770, 1772, 1774, 1776, 1778, 1780, 1782, 1784, 1786, 1788, 1790, 1792, 1794, 1796, 1798, 1800, 1802, 1804, 1806, 1808, 1810, 1812, 1814, 1816, 1818, 1820, 1822, 1824, 1826, 1828, 1830, 1832, 1834, 1836, 1838, 1840, 1842, 1844, 1846, 1848, 1850, 1852, 1854, 1856, 1858, 1860, 1862, 1864, 1866, 1868, 1870, 1872, 1874, 1876, 1878, 1880, 1882, 1884, 1886, 1888, 1890, 1892, 1894, 1896, 1898, 1900, 1902, 1904, 1906, 1908, 1910, 1912, 1914, 1916, 1918, 1920, 1922, 1924, 1926, 1928, 1930, 1932, 1934, 1936, 1938, 1940, 1942, 1944, 1946, 1948, 1950, 1952, 1954, 1956, 1958, 1960, 1962, 1964, 1966, 1968, 1970, 1972, 1974, 1976, 1978, 1980, 1982, 1984, 1986, 1988, 1990, 1992, 1994, 1996, 1998, 2000, 2002, 2004, 2006, 2008, 2010, 2012, 2014, 2016, 2018, 2020, 2022, 2024, 2026, 2028, 2030, 2032, 2034, 2036, 2038, 2040, 2042, 2044, 2046, 2048, 2050, 2052, 2054, 2056, 2058, 2060, 2062, 2064, 2066, 2068, 2070, 2072, 2074, 2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100, 2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126, 2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152, 2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178, 2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204, 2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230, 2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256, 2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282, 2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308, 2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334, 2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360, 2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386, 2388, 2390, 2392, 2394, 2396, 2398, 2400, 2402, 2404, 2406, 2408, 2410, 2412, 2414, 2416, 2418, 2420, 2422, 2424, 2426, 2428, 2430, 2432, 2434, 2436, 2438, 2440, 2442, 2444, 2446, 2448, 2450, 2452, 2454, 2456, 2458, 2460, 2462, 2464, 2466, 2468, 2470, 2472, 2474, 2476, 2478, 2480, 2482, 2484, 2486, 2488, 2490, 2492, 2494, 2496, 2498, 2500, 2502, 2504, 2506, 2508, 2510, 2512, 2514, 2516, 2518, 2520, 2522, 2524, 2526, 2528, 2530, 2532, 2534, 2536, 2538, 2540, 2542, 2544, 2546, 2548, 2550, 2552, 2554, 2556, 2558, 2560, 2562, 2564, 2566, 2568, 2570, 2572, 2574, 2576, 2578, 2580, 2582, 2584, 2586, 2588, 2590, 2592, 2594, 2596, 2598, 2600, 2602, 2604, 2606, 2608, 2610, 2612, 2614, 2616, 2618, 2620, 2622, 2624, 2626, 2628, 2630, 2632, 2634, 2636, 2638, 2640, 2642, 2644, 2646, 2648, 2650, 2652, 2654, 2656, 2658, 2660, 2662, 2664, 2666, 2668, 2670, 2672, 2674, 2676, 2678, 2680, 2682, 2684, 2686, 2688, 2690, 2692, 2694, 2696, 2698, 2700, 2702, 2704, 2706, 2708, 2710, 2712, 2714, 2716, 2718, 2720, 2722, 2724, 2726, 2728, 2730, 2732, 2734, 2736, 2738, 2740, 2742, 2744, 2746, 2748, 2750, 2752, 2754, 2756, 2758, 2760, 2762, 2764, 2766, 2768, 2770, 2772, 2774, 2776, 2778, 2780, 2782, 2784, 2786, 2788, 2790, 2792, 2794, 2796, 2798, 2800, 2802, 2804, 2806, 2808, 2810, 2812, 2814, 2816, 2818, 2820, 2822, 2824, 2826, 2828, 2830, 2832, 2834, 2836, 2838, 2840, 2842, 2844, 2846, 2848, 2850, 2852, 2854, 2856, 2858, 2860, 2862, 2864, 2866, 2868, 2870, 2872, 2874, 2876, 2878, 2880, 2882, 2884, 2886, 2888, 2890, 2892, 2894, 2896, 2898, 2900, 2902, 2904, 2906, 2908, 2910, 2912, 2914, 2916, 2918, 2920, 2922, 2924, 2926, 2928, 2930, 2932, 2934, 2936, 2938, 2940, 2942, 2944, 2946, 2948, 2950, 2952, 2954, 2956, 2958, 2960, 2962, 2964, 2966, 2968, 2970, 2972, 2974, 2976, 2978, 2980, 2982, 2984, 2986, 2988, 2990, 2992, 2994, 2996, 2998, 3000, 3002, 3004, 3006, 3008, 3010,

3012, 3014, 3016, 3018, 3020, 3022, 3024, 3026, 3028, 3030, 3032, 3034, 3036,
3038, 3040, 3042, 3044, 3046, 3048, 3050, 3052, 3054, 3056, 3058, 3060, 3062,
3064, 3066, 3068, 3070, 3072, 3074, 3076, 3078, 3080, 3082, 3084, 3086, 3088,
3090, 3092, 3094, 3096, 3098, 3100, 3102, 3104, 3106, 3108, 3110, 3112, 3114,
3116, 3118, 3120, 3122, 3124, 3126, 3128, 3130, 3132, 3134, 3136, 3138, 3140,
3142, 3144, 3146, 3148, 3150, 3152, 3154, 3156, 3158, 3160, 3162, 3164, 3166,
3168, 3170, 3172, 3174, 3176, 3178, 3180, 3182, 3184, 3186, 3188, 3190, 3192,
3194, 3196, 3198, 3200, 3202, 3204, 3206, 3208, 3210, 3212, 3214, 3216, 3218,
3220, 3222, 3224, 3226, 3228, 3230, 3232, 3234, 3236, 3238, 3240, 3242, 3244,
3246, 3248, 3250, 3252, 3254, 3256, 3258, 3260, 3262, 3264, 3266, 3268, 3270,
3272, 3274, 3276, 3278, 3280, 3282, 3284, 3286, 3288, 3290, 3292, 3294, 3296,
3298, 3300, 3302, 3304, 3306, 3308, 3310, 3312, 3314, 3316, 3318, 3320, 3322,
3324, 3326, 3328, 3330, 3332, 3334, 3336, 3338, 3340, 3342, 3344, 3346, 3348,
3350, 3352, 3354, 3356, 3358, 3360, 3362, 3364, 3366, 3368, 3370, 3372, 3374,
3376, 3378, 3380, 3382, 3384, 3386, 3388, 3390, 3392, 3394, 3396, 3398, 3400,
3402, 3404, 3406, 3408, 3410, 3412, 3414, 3416, 3418, 3420, 3422, 3424, 3426,
3428, 3430, 3432, 3434, 3436, 3438, 3440, 3442, 3444, 3446, 3448, 3450, 3452,
3454, 3456, 3458, 3460, 3462, 3464, 3466, 3468, 3470, 3472, 3474, 3476, 3478,
3480, 3482, 3484, 3486, 3488, 3490, 3492, 3494, 3496, 3498, 3500, 3502, 3504,
3506, 3508, 3510, 3512, 3514, 3516, 3518, 3520, 3522, 3524, 3526, 3528, 3530,
3532, 3534, 3536, 3538, 3540, 3542, 3544, 3546, 3548, 3550, 3552, 3554, 3556,
3558, 3560, 3562, 3564, 3566, 3568, 3570, 3572, 3574, 3576, 3578, 3580, 3582,
3584, 3586, 3588, 3590, 3592, 3594, 3596, 3598, 3600, 3602, 3604, 3606, 3608,
3610, 3612, 3614, 3616, 3618, 3620, 3622, 3624, 3626, 3628, 3630, 3632, 3634,
3636, 3638, 3640, 3642, 3644, 3646, 3648, 3650, 3652, 3654, 3656, 3658, 3660,
3662, 3664, 3666, 3668, 3670, 3672, 3674, 3676, 3678, 3680, 3682, 3684, 3686,
3688, 3690, 3692, 3694, 3696, 3698, 3700, 3702, 3704, 3706, 3708, 3710, 3712,
3714, 3716, 3718, 3720, 3722, 3724, 3726, 3728, 3730, 3732, 3734, 3736, 3738,
3740, 3742, 3744, 3746, 3748, 3750, 3752, 3754, 3756, 3758, 3760, 3762, 3764,
3766, 3768, 3770, 3772, 3774, 3776, 3778, 3780, 3782, 3784, 3786, 3788, 3790,
3792, 3794, 3796, 3798, 3800, 3802, 3804, 3806, 3808, 3810, 3812, 3814, 3816,
3818, 3820, 3822, 3824, 3826, 3828, 3830, 3832, 3834, 3836, 3838, 3840, 3842,
3844, 3846, 3848, 3850, 3852, 3854, 3856, 3858, 3860, 3862, 3864, 3866, 3868,
3870, 3872, 3874, 3876, 3878, 3880, 3882, 3884, 3886, 3888, 3890, 3892, 3894,
3896, 3898, 3900, 3902, 3904, 3906, 3908, 3910, 3912, 3914, 3916, 3918, 3920,
3922, 3924, 3926, 3928, 3930, 3932, 3934, 3936, 3938, 3940, 3942, 3944, 3946,
3948, 3950, 3952, 3954, 3956, 3958, 3960, 3962, 3964, 3966, 3968, 3970, 3972,
3974, 3976, 3978, 3980, 3982, 3984, 3986, 3988, 3990, 3992, 3994, 3996, 3998,
4000, 4002, 4004, 4006, 4008, 4010, 4012, 4014, 4016, 4018, 4020, 4022, 4024,
4026, 4028, 4030, 4032, 4034, 4036, 4038, 4040, 4042, 4044, 4046, 4048, 4050,
4052, 4054, 4056, 4058, 4060, 4062, 4064, 4066, 4068, 4070, 4072, 4074, 4076,
4078, 4080, 4082, 4084, 4086, 4088, 4090, 4092, 4094, 4096, 4098, 4100, 4102,
4104, 4106, 4108, 4110, 4112, 4114, 4116, 4118, 4120, 4122, 4124, 4126, 4128,
4130, 4132, 4134, 4136, 4138, 4140, 4142, 4144, 4146, 4148, 4150, 4152, 4154,
4156, 4158, 4160, 4162, 4164, 4166, 4168, 4170, 4172, 4174, 4176, 4178, 4180,
4182, 4184, 4186, 4188, 4190, 4192, 4194, 4196, 4198, 4200, 4202, 4204, 4206,
4208, 4210, 4212, 4214, 4216, 4218, 4220, 4222, 4224, 4226, 4228, 4230, 4232,
4234, 4236, 4238, 4240, 4242, 4244, 4246, 4248, 4250, 4252, 4254, 4256, 4258,
4260, 4262, 4264, 4266, 4268, 4270, 4272, 4274, 4276, 4278, 4280, 4282, 4284,
4286, 4288, 4290, 4292, 4294, 4296, 4298, 4300, 4302, 4304, 4306, 4308, 4310,
4312, 4314, 4316, 4318, 4320, 4322, 4324, 4326, 4328, 4330, 4332, 4334, 4336,
4338, 4340, 4342, 4344, 4346, 4348, 4350, 4352, 4354, 4356, 4358, 4360, 4362,
4364, 4366, 4368, 4370, 4372, 4374, 4376, 4378, 4380, 4382, 4384, 4386, 4388,
4390, 4392, 4394, 4396, 4398, 4400, 4402, 4404, 4406, 4408, 4410, 4412, 4414,
4416, 4418, 4420, 4422, 4424, 4426, 4428, 4430, 4432, 4434, 4436, 4438, 4440,

4442, 4444, 4446, 4448, 4450, 4452, 4454, 4456, 4458, 4460, 4462, 4464, 4466,
4468, 4470, 4472, 4474, 4476, 4478, 4480, 4482, 4484, 4486, 4488, 4490, 4492,
4494, 4496, 4498, 4500, 4502, 4504, 4506, 4508, 4510, 4512, 4514, 4516, 4518,
4520, 4522, 4524, 4526, 4528, 4530, 4532, 4534, 4536, 4538, 4540, 4542, 4544,
4546, 4548, 4550, 4552, 4554, 4556, 4558, 4560, 4562, 4564, 4566, 4568, 4570,
4572, 4574, 4576, 4578, 4580, 4582, 4584, 4586, 4588, 4590, 4592, 4594, 4596,
4598, 4600, 4602, 4604, 4606, 4608, 4610, 4612, 4614, 4616, 4618, 4620, 4622,
4624, 4626, 4628, 4630, 4632, 4634, 4636, 4638, 4640, 4642, 4644, 4646, 4648,
4650, 4652, 4654, 4656, 4658, 4660, 4662, 4664, 4666, 4668, 4670, 4672, 4674,
4676, 4678, 4680, 4682, 4684, 4686, 4688, 4690, 4692, 4694, 4696, 4698, 4700,
4702, 4704, 4706, 4708, 4710, 4712, 4714, 4716, 4718, 4720, 4722, 4724, 4726,
4728, 4730, 4732, 4734, 4736, 4738, 4740, 4742, 4744, 4746, 4748, 4750, 4752,
4754, 4756, 4758, 4760, 4762, 4764, 4766, 4768, 4770, 4772, 4774, 4776, 4778,
4780, 4782, 4784, 4786, 4788, 4790, 4792, 4794, 4796, 4798, 4800, 4802, 4804,
4806, 4808, 4810, 4812, 4814, 4816, 4818, 4820, 4822, 4824, 4826, 4828, 4830,
4832, 4834, 4836, 4838, 4840, 4842, 4844, 4846, 4848, 4850, 4852, 4854, 4856,
4858, 4860, 4862, 4864, 4866, 4868, 4870, 4872, 4874, 4876, 4878, 4880, 4882,
4884, 4886, 4888, 4890, 4892, 4894, 4896, 4898, 4900, 4902, 4904, 4906, 4908,
4910, 4912, 4914, 4916, 4918, 4920, 4922, 4924, 4926, 4928, 4930, 4932, 4934,
4936, 4938, 4940, 4942, 4944, 4946, 4948, 4950, 4952, 4954, 4956, 4958, 4960,
4962, 4964, 4966, 4968, 4970, 4972, 4974, 4976, 4978, 4980, 4982, 4984, 4986,
4988, 4990, 4992, 4994, 4996, 4998, 5000, 5002, 5004, 5006, 5008, 5010, 5012,
5014, 5016, 5018, 5020, 5022, 5024, 5026, 5028, 5030, 5032, 5034, 5036, 5038,
5040, 5042, 5044, 5046, 5048, 5050, 5052, 5054, 5056, 5058, 5060, 5062, 5064,
5066, 5068, 5070, 5072, 5074, 5076, 5078, 5080, 5082, 5084, 5086, 5088, 5090,
5092, 5094, 5096, 5098, 5100, 5102, 5104, 5106, 5108, 5110, 5112, 5114, 5116,
5118, 5120, 5122, 5124, 5126, 5128, 5130, 5132, 5134, 5136, 5138, 5140, 5142,
5144, 5146, 5148, 5150, 5152, 5154, 5156, 5158, 5160, 5162, 5164, 5166, 5168,
5170, 5172, 5174, 5176, 5178, 5180, 5182, 5184, 5186, 5188, 5190, 5192, 5194,
5196, 5198, 5200, 5202, 5204, 5206, 5208, 5210, 5212, 5214, 5216, 5218, 5220,
5222, 5224, 5226, 5228, 5230, 5232, 5234, 5236, 5238, 5240, 5242, 5244, 5246,
5248, 5250, 5252, 5254, 5256, 5258, 5260, 5262, 5264, 5266, 5268, 5270, 5272,
5274, 5276, 5278, 5280, 5282, 5284, 5286, 5288, 5290, 5292, 5294, 5296, 5298,
5300, 5302, 5304, 5306, 5308, 5310, 5312, 5314, 5316, 5318, 5320, 5322, 5324,
5326, 5328, 5330, 5332, 5334, 5336, 5338, 5340, 5342, 5344, 5346, 5348, 5350,
5352, 5354, 5356, 5358, 5360, 5362, 5364, 5366, 5368, 5370, 5372, 5374, 5376,
5378, 5380, 5382, 5384, 5386, 5388, 5390, 5392, 5394, 5396, 5398, 5400, 5402,
5404, 5406, 5408, 5410, 5412, 5414, 5416, 5418, 5420, 5422, 5424, 5426, 5428,
5430, 5432, 5434, 5436, 5438, 5440, 5442, 5444, 5446, 5448, 5450, 5452, 5454,
5456, 5458, 5460, 5462, 5464, 5466, 5468, 5470, 5472, 5474, 5476, 5478, 5480,
5482, 5484, 5486, 5488, 5490, 5492, 5494, 5496, 5498, 5500, 5502, 5504, 5506,
5508, 5510, 5512, 5514, 5516, 5518, 5520, 5522, 5524, 5526, 5528, 5530, 5532,
5534, 5536, 5538, 5540, 5542, 5544, 5546, 5548, 5550, 5552, 5554, 5556, 5558,
5560, 5562, 5564, 5566, 5568, 5570, 5572, 5574, 5576, 5578, 5580, 5582, 5584,
5586, 5588, 5590, 5592, 5594, 5596, 5598, 5600, 5602, 5604, 5606, 5608, 5610,
5612, 5614, 5616, 5618, 5620, 5622, 5624, 5626, 5628, 5630, 5632, 5634, 5636,
5638, 5640, 5642, 5644, 5646, 5648, 5650, 5652, 5654, 5656, 5658, 5660, 5662,
5664, 5666, 5668, 5670, 5672, 5674, 5676, 5678, 5680, 5682, 5684, 5686, 5688,
5690, 5692, 5694, 5696, 5698, 5700, 5702, 5704, 5706, 5708, 5710, 5712, 5714,
5716, 5718, 5720, 5722, 5724, 5726, 5728, 5730, 5732, 5734, 5736, 5738, 5740,
5742, 5744, 5746, 5748, 5750, 5752, 5754, 5756, 5758, 5760, 5762, 5764, 5766,
5768, 5770, 5772, 5774, 5776, 5778, 5780, 5782, 5784, 5786, 5788, 5790, 5792,
5794, 5796, 5798, 5800, 5802, 5804, 5806, 5808, 5810, 5812, 5814, 5816, 5818,
5820, 5822, 5824, 5826, 5828, 5830, 5832, 5834, 5836, 5838, 5840, 5842, 5844,
5846, 5848, 5850, 5852, 5854, 5856, 5858, 5860, 5862, 5864, 5866, 5868, 5870,

5872, 5874, 5876, 5878, 5880, 5882, 5884, 5886, 5888, 5890, 5892, 5894, 5896,
5898, 5900, 5902, 5904, 5906, 5908, 5910, 5912, 5914, 5916, 5918, 5920, 5922,
5924, 5926, 5928, 5930, 5932, 5934, 5936, 5938, 5940, 5942, 5944, 5946, 5948,
5950, 5952, 5954, 5956, 5958, 5960, 5962, 5964, 5966, 5968, 5970, 5972, 5974,
5976, 5978, 5980, 5982, 5984, 5986, 5988, 5990, 5992, 5994, 5996, 5998, 6000,
6002, 6004, 6006, 6008, 6010, 6012, 6014, 6016, 6018, 6020, 6022, 6024, 6026,
6028, 6030, 6032, 6034, 6036, 6038, 6040, 6042, 6044, 6046, 6048, 6050, 6052,
6054, 6056, 6058, 6060, 6062, 6064, 6066, 6068, 6070, 6072, 6074, 6076, 6078,
6080, 6082, 6084, 6086, 6088, 6090, 6092, 6094, 6096, 6098, 6100, 6102, 6104,
6106, 6108, 6110, 6112, 6114, 6116, 6118, 6120, 6122, 6124, 6126, 6128, 6130,
6132, 6134, 6136, 6138, 6140, 6142, 6144, 6146, 6148, 6150, 6152, 6154, 6156,
6158, 6160, 6162, 6164, 6166, 6168, 6170, 6172, 6174, 6176, 6178, 6180, 6182,
6184, 6186, 6188, 6190, 6192, 6194, 6196, 6198, 6200, 6202, 6204, 6206, 6208,
6210, 6212, 6214, 6216, 6218, 6220, 6222, 6224, 6226, 6228, 6230, 6232, 6234,
6236, 6238, 6240, 6242, 6244, 6246, 6248, 6250, 6252, 6254, 6256, 6258, 6260,
6262, 6264, 6266, 6268, 6270, 6272, 6274, 6276, 6278, 6280, 6282, 6284, 6286,
6288, 6290, 6292, 6294, 6296, 6298, 6300, 6302, 6304, 6306, 6308, 6310, 6312,
6314, 6316, 6318, 6320, 6322, 6324, 6326, 6328, 6330, 6332, 6334, 6336, 6338,
6340, 6342, 6344, 6346, 6348, 6350, 6352, 6354, 6356, 6358, 6360, 6362, 6364,
6366, 6368, 6370, 6372, 6374, 6376, 6378, 6380, 6382, 6384, 6386, 6388, 6390,
6392, 6394, 6396, 6398, 6400, 6402, 6404, 6406, 6408, 6410, 6412, 6414, 6416,
6418, 6420, 6422, 6424, 6426, 6428, 6430, 6432, 6434, 6436, 6438, 6440, 6442,
6444, 6446, 6448, 6450, 6452, 6454, 6456, 6458, 6460, 6462, 6464, 6466, 6468,
6470, 6472, 6474, 6476, 6478, 6480, 6482, 6484, 6486, 6488, 6490, 6492, 6494,
6496, 6498, 6500, 6502, 6504, 6506, 6508, 6510, 6512, 6514, 6516, 6518, 6520,
6522, 6524, 6526, 6528, 6530, 6532, 6534, 6536, 6538, 6540, 6542, 6544, 6546,
6548, 6550, 6552, 6554, 6556, 6558, 6560, 6562, 6564, 6566, 6568, 6570, 6572,
6574, 6576, 6578, 6580, 6582, 6584, 6586, 6588, 6590, 6592, 6594, 6596, 6598,
6600, 6602, 6604, 6606, 6608, 6610, 6612, 6614, 6616, 6618, 6620, 6622, 6624,
6626, 6628, 6630, 6632, 6634, 6636, 6638, 6640, 6642, 6644, 6646, 6648, 6650,
6652, 6654, 6656, 6658, 6660, 6662, 6664, 6666, 6668, 6670, 6672, 6674, 6676,
6678, 6680, 6682, 6684, 6686, 6688, 6690, 6692, 6694, 6696, 6698, 6700, 6702,
6704, 6706, 6708, 6710, 6712, 6714, 6716, 6718, 6720, 6722, 6724, 6726, 6728,
6730, 6732, 6734, 6736, 6738, 6740, 6742, 6744, 6746, 6748, 6750, 6752, 6754,
6756, 6758, 6760, 6762, 6764, 6766, 6768, 6770, 6772, 6774, 6776, 6778, 6780,
6782, 6784, 6786, 6788, 6790, 6792, 6794, 6796, 6798, 6800, 6802, 6804, 6806,
6808, 6810, 6812, 6814, 6816, 6818, 6820, 6822, 6824, 6826, 6828, 6830, 6832,
6834, 6836, 6838, 6840, 6842, 6844, 6846, 6848, 6850, 6852, 6854, 6856, 6858,
6860, 6862, 6864, 6866, 6868, 6870, 6872, 6874, 6876, 6878, 6880, 6882, 6884,
6886, 6888, 6890, 6892, 6894, 6896, 6898, 6900, 6902, 6904, 6906, 6908, 6910,
6912, 6914, 6916, 6918, 6920, 6922, 6924, 6926, 6928, 6930, 6932, 6934, 6936,
6938, 6940, 6942, 6944, 6946, 6948, 6950, 6952, 6954, 6956, 6958, 6960, 6962,
6964, 6966, 6968, 6970, 6972, 6974, 6976, 6978, 6980, 6982, 6984, 6986, 6988,
6990, 6992, 6994, 6996, 6998, 7000, 7002, 7004, 7006, 7008, 7010, 7012, 7014,
7016, 7018, 7020, 7022, 7024, 7026, 7028, 7030, 7032, 7034, 7036, 7038, 7040,
7042, 7044, 7046, 7048, 7050, 7052, 7054, 7056, 7058, 7060, 7062, 7064, 7066,
7068, 7070, 7072, 7074, 7076, 7078, 7080, 7082, 7084, 7086, 7088, 7090, 7092,
7094, 7096, 7098, 7100, 7102, 7104, 7106, 7108, 7110, 7112, 7114, 7116, 7118,
7120, 7122, 7124, 7126, 7128, 7130, 7132, 7134, 7136, 7138, 7140, 7142, 7144,
7146, 7148, 7150, 7152, 7154, 7156, 7158, 7160, 7162, 7164, 7166, 7168, 7170,
7172, 7174, 7176, 7178, 7180, 7182, 7184, 7186, 7188, 7190, 7192, 7194, 7196,
7198, 7200, 7202, 7204, 7206, 7208, 7210, 7212, 7214, 7216, 7218, 7220, 7222,
7224, 7226, 7228, 7230, 7232, 7234, 7236, 7238, 7240, 7242, 7244, 7246, 7248,
7250, 7252, 7254, 7256, 7258, 7260, 7262, 7264, 7266, 7268, 7270, 7272, 7274,
7276, 7278, 7280, 7282, 7284, 7286, 7288, 7290, 7292, 7294, 7296, 7298, 7300,

7302, 7304, 7306, 7308, 7310, 7312, 7314, 7316, 7318, 7320, 7322, 7324, 7326, 7328, 7330, 7332, 7334, 7336, 7338, 7340, 7342, 7344, 7346, 7348, 7350, 7352, 7354, 7356, 7358, 7360, 7362, 7364, 7366, 7368, 7370, 7372, 7374, 7376, 7378, 7380, 7382, 7384, 7386, 7388, 7390, 7392, 7394, 7396, 7398, 7400, 7402, 7404, 7406, 7408, 7410, 7412, 7414, 7416, 7418, 7420, 7422, 7424, 7426, 7428, 7430, 7432, 7434, 7436, 7438, 7440, 7442, 7444, 7446, 7448, 7450, 7452, 7454, 7456, 7458, 7460, 7462, 7464, 7466, 7468, 7470, 7472, 7474, 7476, 7478, 7480, 7482, 7484, 7486, 7488, 7490, 7492, 7494, 7496, 7498, 7500, 7502, 7504, 7506, 7508, 7510, 7512, 7514, 7516, 7518, 7520, 7522, 7524, 7526, 7528, 7530, 7532, 7534, 7536, 7538, 7540, 7542, 7544, 7546, 7548, 7550, 7552, 7554, 7556, 7558, 7560, 7562, 7564, 7566, 7568, 7570, 7572, 7574, 7576, 7578, 7580, 7582, 7584, 7586, 7588, 7590, 7592, 7594, 7596, 7598, 7600, 7602, 7604, 7606, 7608, 7610, 7612, 7614, 7616, 7618, 7620, 7622, 7624, 7626, 7628, 7630, 7632, 7634, 7636, 7638, 7640, 7642, 7644, 7646, 7648, 7650, 7652, 7654, 7656, 7658, 7660, 7662, 7664, 7666, 7668, 7670, 7672, 7674, 7676, 7678, 7680, 7682, 7684, 7686, 7688, 7690, 7692, 7694, 7696, 7698, 7700, 7702, 7704, 7706, 7708, 7710, 7712, 7714, 7716, 7718, 7720, 7722, 7724, 7726, 7728, 7730, 7732, 7734, 7736, 7738, 7740, 7742, 7744, 7746, 7748, 7750, 7752, 7754, 7756, 7758, 7760, 7762, 7764, 7766, 7768, 7770, 7772, 7774, 7776, 7778, 7780, 7782, 7784, 7786, 7788, 7790, 7792, 7794, 7796, 7798, 7800, 7802, 7804, 7806, 7808, 7810, 7812, 7814, 7816, 7818, 7820, 7822, 7824, 7826, 7828, 7830, 7832, 7834, 7836, 7838, 7840, 7842, 7844, 7846, 7848, 7850, 7852, 7854, 7856, 7858, 7860, 7862, 7864, 7866, 7868, 7870, 7872, 7874, 7876, 7878, 7880, 7882, 7884, 7886, 7888, 7890, 7892, 7894, 7896, 7898, 7900, 7902, 7904, 7906, 7908, 7910, 7912, 7914, 7916, 7918, 7920, 7922, 7924, 7926, 7928, 7930, 7932, 7934, 7936, 7938, 7940, 7942, 7944, 7946, 7948, 7950, 7952, 7954, 7956, 7958, 7960, 7962, 7964, 7966, 7968, 7970, 7972, 7974, 7976, 7978, 7980, 7982, 7984, 7986, 7988, 7990, 7992, 7994, 7996, 7998, 8000, 8002, 8004, 8006, 8008, 8010, 8012, 8014, 8016, 8018, 8020, 8022, 8024, 8026, 8028, 8030, 8032, 8034, 8036, 8038, 8040, 8042, 8044, 8046, 8048, 8050, 8052, 8054, 8056, 8058, 8060, 8062, 8064, 8066, 8068, 8070, 8072, 8074, 8076, 8078, 8080, 8082, 8084, 8086, 8088, 8090, 8092, 8094, 8096, 8098, 8100, 8102, 8104, 8106, 8108, 8110, 8112, 8114, 8116, 8118, 8120, 8122, 8124, 8126, 8128, 8130, 8132, 8134, 8136, 8138, 8140, 8142, 8144, 8146, 8148, 8150, 8152, 8154, 8156, 8158, 8160, 8162, 8164, 8166, 8168, 8170, 8172, 8174, 8176, 8178, 8180, 8182, 8184, 8186, 8188, 8190, 8192, 8194, 8196, 8198, 8200, 8202, 8204, 8206, 8208, 8210, 8212, 8214, 8216, 8218, 8220, 8222, 8224, 8226, 8228, 8230, 8232, 8234, 8236, 8238, 8240, 8242, 8244, 8246, 8248, 8250, 8252, 8254, 8256, 8258, 8260, 8262, 8264, 8266, 8268, 8270, 8272, 8274, 8276, 8278, 8280, 8282, 8284, 8286, 8288, 8290, 8292, 8294, 8296, 8298, 8300, 8302, 8304, 8306, 8308, 8310, 8312, 8314, 8316, 8318, 8320, 8322, 8324, 8326, 8328, 8330, 8332, 8334, 8336, 8338, 8340, 8342, 8344, 8346, 8348, 8350, 8352, 8354, 8356, 8358, 8360, 8362, 8364, 8366, 8368, 8370, 8372, 8374, 8376, 8378, 8380, 8382, 8384, 8386, 8388, 8390, 8392, 8394, 8396, 8398, 8400, 8402, 8404, 8406, 8408, 8410, 8412, 8414, 8416, 8418, 8420, 8422, 8424, 8426, 8428, 8430, 8432, 8434, 8436, 8438, 8440, 8442, 8444, 8446, 8448, 8450, 8452, 8454, 8456, 8458, 8460, 8462, 8464, 8466, 8468, 8470, 8472, 8474, 8476, 8478, 8480, 8482, 8484, 8486, 8488, 8490, 8492, 8494, 8496, 8498, 8500, 8502, 8504, 8506, 8508, 8510, 8512, 8514, 8516, 8518, 8520, 8522, 8524, 8526, 8528, 8530, 8532, 8534, 8536, 8538, 8540, 8542, 8544, 8546, 8548, 8550, 8552, 8554, 8556, 8558, 8560, 8562, 8564, 8566, 8568, 8570, 8572, 8574, 8576, 8578, 8580, 8582, 8584, 8586, 8588, 8590, 8592, 8594, 8596, 8598, 8600, 8602, 8604, 8606, 8608, 8610, 8612, 8614, 8616, 8618, 8620, 8622, 8624, 8626, 8628, 8630, 8632, 8634, 8636, 8638, 8640, 8642, 8644, 8646, 8648, 8650, 8652, 8654, 8656, 8658, 8660, 8662, 8664, 8666, 8668, 8670, 8672, 8674, 8676, 8678, 8680, 8682, 8684, 8686, 8688, 8690, 8692, 8694, 8696, 8698, 8700, 8702, 8704, 8706, 8708, 8710, 8712, 8714, 8716, 8718, 8720, 8722, 8724, 8726, 8728, 8730,

8732, 8734, 8736, 8738, 8740, 8742, 8744, 8746, 8748, 8750, 8752, 8754, 8756,
8758, 8760, 8762, 8764, 8766, 8768, 8770, 8772, 8774, 8776, 8778, 8780, 8782,
8784, 8786, 8788, 8790, 8792, 8794, 8796, 8798, 8800, 8802, 8804, 8806, 8808,
8810, 8812, 8814, 8816, 8818, 8820, 8822, 8824, 8826, 8828, 8830, 8832, 8834,
8836, 8838, 8840, 8842, 8844, 8846, 8848, 8850, 8852, 8854, 8856, 8858, 8860,
8862, 8864, 8866, 8868, 8870, 8872, 8874, 8876, 8878, 8880, 8882, 8884, 8886,
8888, 8890, 8892, 8894, 8896, 8898, 8900, 8902, 8904, 8906, 8908, 8910, 8912,
8914, 8916, 8918, 8920, 8922, 8924, 8926, 8928, 8930, 8932, 8934, 8936, 8938,
8940, 8942, 8944, 8946, 8948, 8950, 8952, 8954, 8956, 8958, 8960, 8962, 8964,
8966, 8968, 8970, 8972, 8974, 8976, 8978, 8980, 8982, 8984, 8986, 8988, 8990,
8992, 8994, 8996, 8998, 9000, 9002, 9004, 9006, 9008, 9010, 9012, 9014, 9016,
9018, 9020, 9022, 9024, 9026, 9028, 9030, 9032, 9034, 9036, 9038, 9040, 9042,
9044, 9046, 9048, 9050, 9052, 9054, 9056, 9058, 9060, 9062, 9064, 9066, 9068,
9070, 9072, 9074, 9076, 9078, 9080, 9082, 9084, 9086, 9088, 9090, 9092, 9094,
9096, 9098, 9100, 9102, 9104, 9106, 9108, 9110, 9112, 9114, 9116, 9118, 9120,
9122, 9124, 9126, 9128, 9130, 9132, 9134, 9136, 9138, 9140, 9142, 9144, 9146,
9148, 9150, 9152, 9154, 9156, 9158, 9160, 9162, 9164, 9166, 9168, 9170, 9172,
9174, 9176, 9178, 9180, 9182, 9184, 9186, 9188, 9190, 9192, 9194, 9196, 9198,
9200, 9202, 9204, 9206, 9208, 9210, 9212, 9214, 9216, 9218, 9220, 9222, 9224,
9226, 9228, 9230, 9232, 9234, 9236, 9238, 9240, 9242, 9244, 9246, 9248, 9250,
9252, 9254, 9256, 9258, 9260, 9262, 9264, 9266, 9268, 9270, 9272, 9274, 9276,
9278, 9280, 9282, 9284, 9286, 9288, 9290, 9292, 9294, 9296, 9298, 9300, 9302,
9304, 9306, 9308, 9310, 9312, 9314, 9316, 9318, 9320, 9322, 9324, 9326, 9328,
9330, 9332, 9334, 9336, 9338, 9340, 9342, 9344, 9346, 9348, 9350, 9352, 9354,
9356, 9358, 9360, 9362, 9364, 9366, 9368, 9370, 9372, 9374, 9376, 9378, 9380,
9382, 9384, 9386, 9388, 9390, 9392, 9394, 9396, 9398, 9400, 9402, 9404, 9406,
9408, 9410, 9412, 9414, 9416, 9418, 9420, 9422, 9424, 9426, 9428, 9430, 9432,
9434, 9436, 9438, 9440, 9442, 9444, 9446, 9448, 9450, 9452, 9454, 9456, 9458,
9460, 9462, 9464, 9466, 9468, 9470, 9472, 9474, 9476, 9478, 9480, 9482, 9484,
9486, 9488, 9490, 9492, 9494, 9496, 9498, 9500, 9502, 9504, 9506, 9508, 9510,
9512, 9514, 9516, 9518, 9520, 9522, 9524, 9526, 9528, 9530, 9532, 9534, 9536,
9538, 9540, 9542, 9544, 9546, 9548, 9550, 9552, 9554, 9556, 9558, 9560, 9562,
9564, 9566, 9568, 9570, 9572, 9574, 9576, 9578, 9580, 9582, 9584, 9586, 9588,
9590, 9592, 9594, 9596, 9598, 9600, 9602, 9604, 9606, 9608, 9610, 9612, 9614,
9616, 9618, 9620, 9622, 9624, 9626, 9628, 9630, 9632, 9634, 9636, 9638, 9640,
9642, 9644, 9646, 9648, 9650, 9652, 9654, 9656, 9658, 9660, 9662, 9664, 9666,
9668, 9670, 9672, 9674, 9676, 9678, 9680, 9682, 9684, 9686, 9688, 9690, 9692,
9694, 9696, 9698, 9700, 9702, 9704, 9706, 9708, 9710, 9712, 9714, 9716, 9718,
9720, 9722, 9724, 9726, 9728, 9730, 9732, 9734, 9736, 9738, 9740, 9742, 9744,
9746, 9748, 9750, 9752, 9754, 9756, 9758, 9760, 9762, 9764, 9766, 9768, 9770,
9772, 9774, 9776, 9778, 9780, 9782, 9784, 9786, 9788, 9790, 9792, 9794, 9796,
9798, 9800, 9802, 9804, 9806, 9808, 9810, 9812, 9814, 9816, 9818, 9820, 9822,
9824, 9826, 9828, 9830, 9832, 9834, 9836, 9838, 9840, 9842, 9844, 9846, 9848,
9850, 9852, 9854, 9856, 9858, 9860, 9862, 9864, 9866, 9868, 9870, 9872, 9874,
9876, 9878, 9880, 9882, 9884, 9886, 9888, 9890, 9892, 9894, 9896, 9898, 9900,
9902, 9904, 9906, 9908, 9910, 9912, 9914, 9916, 9918, 9920, 9922, 9924, 9926,
9928, 9930, 9932, 9934, 9936, 9938, 9940, 9942, 9944, 9946, 9948, 9950, 9952,
9954, 9956, 9958, 9960, 9962, 9964, 9966, 9968, 9970, 9972, 9974, 9976, 9978,
9980, 9982, 9984, 9986, 9988, 9990, 9992, 9994, 9996, 9998]

[1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31, 33, 35, 37, 39, 41, 43, 45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81, 83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115, 117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145, 147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175, 177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199, 201, 203, 205, 207, 209, 211, 213, 215, 217, 219, 221, 223, 225, 227, 229, 231, 233, 235, 237, 239, 241, 243, 245, 247, 249, 251, 253, 255, 257, 259, 261, 263, 265, 267, 269, 271, 273, 275, 277, 279, 281, 283, 285, 287, 289, 291, 293, 295, 297, 299, 301, 303, 305, 307, 309, 311, 313, 315, 317, 319, 321, 323, 325, 327, 329, 331, 333, 335, 337, 339, 341, 343, 345, 347, 349, 351, 353, 355, 357, 359, 361, 363, 365, 367, 369, 371, 373, 375, 377, 379, 381, 383, 385, 387, 389, 391, 393, 395, 397, 399, 401, 403, 405, 407, 409, 411, 413, 415, 417, 419, 421, 423, 425, 427, 429, 431, 433, 435, 437, 439, 441, 443, 445, 447, 449, 451, 453, 455, 457, 459, 461, 463, 465, 467, 469, 471, 473, 475, 477, 479, 481, 483, 485, 487, 489, 491, 493, 495, 497, 499, 501, 503, 505, 507, 509, 511, 513, 515, 517, 519, 521, 523, 525, 527, 529, 531, 533, 535, 537, 539, 541, 543, 545, 547, 549, 551, 553, 555, 557, 559, 561, 563, 565, 567, 569, 571, 573, 575, 577, 579, 581, 583, 585, 587, 589, 591, 593, 595, 597, 599, 601, 603, 605, 607, 609, 611, 613, 615, 617, 619, 621, 623, 625, 627, 629, 631, 633, 635, 637, 639, 641, 643, 645, 647, 649, 651, 653, 655, 657, 659, 661, 663, 665, 667, 669, 671, 673, 675, 677, 679, 681, 683, 685, 687, 689, 691, 693, 695, 697, 699, 701, 703, 705, 707, 709, 711, 713, 715, 717, 719, 721, 723, 725, 727, 729, 731, 733, 735, 737, 739, 741, 743, 745, 747, 749, 751, 753, 755, 757, 759, 761, 763, 765, 767, 769, 771, 773, 775, 777, 779, 781, 783, 785, 787, 789, 791, 793, 795, 797, 799, 801, 803, 805, 807, 809, 811, 813, 815, 817, 819, 821, 823, 825, 827, 829, 831, 833, 835, 837, 839, 841, 843, 845, 847, 849, 851, 853, 855, 857, 859, 861, 863, 865, 867, 869, 871, 873, 875, 877, 879, 881, 883, 885, 887, 889, 891, 893, 895, 897, 899, 901, 903, 905, 907, 909, 911, 913, 915, 917, 919, 921, 923, 925, 927, 929, 931, 933, 935, 937, 939, 941, 943, 945, 947, 949, 951, 953, 955, 957, 959, 961, 963, 965, 967, 969, 971, 973, 975, 977, 979, 981, 983, 985, 987, 989, 991, 993, 995, 997, 999, 1001, 1003, 1005, 1007, 1009, 1011, 1013, 1015, 1017, 1019, 1021, 1023, 1025, 1027, 1029, 1031, 1033, 1035, 1037, 1039, 1041, 1043, 1045, 1047, 1049, 1051, 1053, 1055, 1057, 1059, 1061, 1063, 1065, 1067, 1069, 1071, 1073, 1075, 1077, 1079, 1081, 1083, 1085, 1087, 1089, 1091, 1093, 1095, 1097, 1099, 1101, 1103, 1105, 1107, 1109, 1111, 1113, 1115, 1117, 1119, 1121, 1123, 1125, 1127, 1129, 1131, 1133, 1135, 1137, 1139, 1141, 1143, 1145, 1147, 1149, 1151, 1153, 1155, 1157, 1159, 1161, 1163, 1165, 1167, 1169, 1171, 1173, 1175, 1177, 1179, 1181, 1183, 1185, 1187, 1189, 1191, 1193, 1195, 1197, 1199, 1201, 1203, 1205, 1207, 1209, 1211, 1213, 1215, 1217, 1219, 1221, 1223, 1225, 1227, 1229, 1231, 1233, 1235, 1237, 1239, 1241, 1243, 1245, 1247, 1249, 1251, 1253, 1255, 1257, 1259, 1261, 1263, 1265, 1267, 1269, 1271, 1273, 1275, 1277, 1279, 1281, 1283, 1285, 1287, 1289, 1291, 1293, 1295, 1297, 1299, 1301, 1303, 1305, 1307, 1309, 1311, 1313, 1315, 1317, 1319, 1321, 1323, 1325, 1327, 1329, 1331, 1333, 1335, 1337, 1339, 1341, 1343, 1345, 1347, 1349, 1351, 1353, 1355, 1357, 1359, 1361, 1363, 1365, 1367, 1369, 1371, 1373, 1375, 1377, 1379, 1381, 1383, 1385, 1387, 1389, 1391, 1393, 1395, 1397, 1399, 1401, 1403, 1405, 1407, 1409, 1411, 1413, 1415, 1417, 1419, 1421, 1423, 1425, 1427, 1429, 1431, 1433, 1435, 1437, 1439, 1441, 1443, 1445, 1447, 1449, 1451, 1453, 1455, 1457, 1459, 1461, 1463, 1465, 1467, 1469, 1471, 1473, 1475, 1477, 1479, 1481, 1483, 1485, 1487, 1489, 1491, 1493, 1495, 1497, 1499, 1501, 1503, 1505, 1507, 1509, 1511, 1513, 1515, 1517, 1519, 1521, 1523, 1525, 1527, 1529, 1531, 1533, 1535, 1537, 1539, 1541, 1543, 1545, 1547, 1549, 1551, 1553, 1555, 1557, 1559, 1561, 1563, 1565, 1567, 1569, 1571, 1573, 1575, 1577, 1579, 1581,

1583, 1585, 1587, 1589, 1591, 1593, 1595, 1597, 1599, 1601, 1603, 1605, 1607,
1609, 1611, 1613, 1615, 1617, 1619, 1621, 1623, 1625, 1627, 1629, 1631, 1633,
1635, 1637, 1639, 1641, 1643, 1645, 1647, 1649, 1651, 1653, 1655, 1657, 1659,
1661, 1663, 1665, 1667, 1669, 1671, 1673, 1675, 1677, 1679, 1681, 1683, 1685,
1687, 1689, 1691, 1693, 1695, 1697, 1699, 1701, 1703, 1705, 1707, 1709, 1711,
1713, 1715, 1717, 1719, 1721, 1723, 1725, 1727, 1729, 1731, 1733, 1735, 1737,
1739, 1741, 1743, 1745, 1747, 1749, 1751, 1753, 1755, 1757, 1759, 1761, 1763,
1765, 1767, 1769, 1771, 1773, 1775, 1777, 1779, 1781, 1783, 1785, 1787, 1789,
1791, 1793, 1795, 1797, 1799, 1801, 1803, 1805, 1807, 1809, 1811, 1813, 1815,
1817, 1819, 1821, 1823, 1825, 1827, 1829, 1831, 1833, 1835, 1837, 1839, 1841,
1843, 1845, 1847, 1849, 1851, 1853, 1855, 1857, 1859, 1861, 1863, 1865, 1867,
1869, 1871, 1873, 1875, 1877, 1879, 1881, 1883, 1885, 1887, 1889, 1891, 1893,
1895, 1897, 1899, 1901, 1903, 1905, 1907, 1909, 1911, 1913, 1915, 1917, 1919,
1921, 1923, 1925, 1927, 1929, 1931, 1933, 1935, 1937, 1939, 1941, 1943, 1945,
1947, 1949, 1951, 1953, 1955, 1957, 1959, 1961, 1963, 1965, 1967, 1969, 1971,
1973, 1975, 1977, 1979, 1981, 1983, 1985, 1987, 1989, 1991, 1993, 1995, 1997,
1999, 2001, 2003, 2005, 2007, 2009, 2011, 2013, 2015, 2017, 2019, 2021, 2023,
2025, 2027, 2029, 2031, 2033, 2035, 2037, 2039, 2041, 2043, 2045, 2047, 2049,
2051, 2053, 2055, 2057, 2059, 2061, 2063, 2065, 2067, 2069, 2071, 2073, 2075,
2077, 2079, 2081, 2083, 2085, 2087, 2089, 2091, 2093, 2095, 2097, 2099, 2101,
2103, 2105, 2107, 2109, 2111, 2113, 2115, 2117, 2119, 2121, 2123, 2125, 2127,
2129, 2131, 2133, 2135, 2137, 2139, 2141, 2143, 2145, 2147, 2149, 2151, 2153,
2155, 2157, 2159, 2161, 2163, 2165, 2167, 2169, 2171, 2173, 2175, 2177, 2179,
2181, 2183, 2185, 2187, 2189, 2191, 2193, 2195, 2197, 2199, 2201, 2203, 2205,
2207, 2209, 2211, 2213, 2215, 2217, 2219, 2221, 2223, 2225, 2227, 2229, 2231,
2233, 2235, 2237, 2239, 2241, 2243, 2245, 2247, 2249, 2251, 2253, 2255, 2257,
2259, 2261, 2263, 2265, 2267, 2269, 2271, 2273, 2275, 2277, 2279, 2281, 2283,
2285, 2287, 2289, 2291, 2293, 2295, 2297, 2299, 2301, 2303, 2305, 2307, 2309,
2311, 2313, 2315, 2317, 2319, 2321, 2323, 2325, 2327, 2329, 2331, 2333, 2335,
2337, 2339, 2341, 2343, 2345, 2347, 2349, 2351, 2353, 2355, 2357, 2359, 2361,
2363, 2365, 2367, 2369, 2371, 2373, 2375, 2377, 2379, 2381, 2383, 2385, 2387,
2389, 2391, 2393, 2395, 2397, 2399, 2401, 2403, 2405, 2407, 2409, 2411, 2413,
2415, 2417, 2419, 2421, 2423, 2425, 2427, 2429, 2431, 2433, 2435, 2437, 2439,
2441, 2443, 2445, 2447, 2449, 2451, 2453, 2455, 2457, 2459, 2461, 2463, 2465,
2467, 2469, 2471, 2473, 2475, 2477, 2479, 2481, 2483, 2485, 2487, 2489, 2491,
2493, 2495, 2497, 2499, 2501, 2503, 2505, 2507, 2509, 2511, 2513, 2515, 2517,
2519, 2521, 2523, 2525, 2527, 2529, 2531, 2533, 2535, 2537, 2539, 2541, 2543,
2545, 2547, 2549, 2551, 2553, 2555, 2557, 2559, 2561, 2563, 2565, 2567, 2569,
2571, 2573, 2575, 2577, 2579, 2581, 2583, 2585, 2587, 2589, 2591, 2593, 2595,
2597, 2599, 2601, 2603, 2605, 2607, 2609, 2611, 2613, 2615, 2617, 2619, 2621,
2623, 2625, 2627, 2629, 2631, 2633, 2635, 2637, 2639, 2641, 2643, 2645, 2647,
2649, 2651, 2653, 2655, 2657, 2659, 2661, 2663, 2665, 2667, 2669, 2671, 2673,
2675, 2677, 2679, 2681, 2683, 2685, 2687, 2689, 2691, 2693, 2695, 2697, 2699,
2701, 2703, 2705, 2707, 2709, 2711, 2713, 2715, 2717, 2719, 2721, 2723, 2725,
2727, 2729, 2731, 2733, 2735, 2737, 2739, 2741, 2743, 2745, 2747, 2749, 2751,
2753, 2755, 2757, 2759, 2761, 2763, 2765, 2767, 2769, 2771, 2773, 2775, 2777,
2779, 2781, 2783, 2785, 2787, 2789, 2791, 2793, 2795, 2797, 2799, 2801, 2803,
2805, 2807, 2809, 2811, 2813, 2815, 2817, 2819, 2821, 2823, 2825, 2827, 2829,
2831, 2833, 2835, 2837, 2839, 2841, 2843, 2845, 2847, 2849, 2851, 2853, 2855,
2857, 2859, 2861, 2863, 2865, 2867, 2869, 2871, 2873, 2875, 2877, 2879, 2881,
2883, 2885, 2887, 2889, 2891, 2893, 2895, 2897, 2899, 2901, 2903, 2905, 2907,
2909, 2911, 2913, 2915, 2917, 2919, 2921, 2923, 2925, 2927, 2929, 2931, 2933,
2935, 2937, 2939, 2941, 2943, 2945, 2947, 2949, 2951, 2953, 2955, 2957, 2959,
2961, 2963, 2965, 2967, 2969, 2971, 2973, 2975, 2977, 2979, 2981, 2983, 2985,
2987, 2989, 2991, 2993, 2995, 2997, 2999, 3001, 3003, 3005, 3007, 3009, 3011,

3013, 3015, 3017, 3019, 3021, 3023, 3025, 3027, 3029, 3031, 3033, 3035, 3037,
3039, 3041, 3043, 3045, 3047, 3049, 3051, 3053, 3055, 3057, 3059, 3061, 3063,
3065, 3067, 3069, 3071, 3073, 3075, 3077, 3079, 3081, 3083, 3085, 3087, 3089,
3091, 3093, 3095, 3097, 3099, 3101, 3103, 3105, 3107, 3109, 3111, 3113, 3115,
3117, 3119, 3121, 3123, 3125, 3127, 3129, 3131, 3133, 3135, 3137, 3139, 3141,
3143, 3145, 3147, 3149, 3151, 3153, 3155, 3157, 3159, 3161, 3163, 3165, 3167,
3169, 3171, 3173, 3175, 3177, 3179, 3181, 3183, 3185, 3187, 3189, 3191, 3193,
3195, 3197, 3199, 3201, 3203, 3205, 3207, 3209, 3211, 3213, 3215, 3217, 3219,
3221, 3223, 3225, 3227, 3229, 3231, 3233, 3235, 3237, 3239, 3241, 3243, 3245,
3247, 3249, 3251, 3253, 3255, 3257, 3259, 3261, 3263, 3265, 3267, 3269, 3271,
3273, 3275, 3277, 3279, 3281, 3283, 3285, 3287, 3289, 3291, 3293, 3295, 3297,
3299, 3301, 3303, 3305, 3307, 3309, 3311, 3313, 3315, 3317, 3319, 3321, 3323,
3325, 3327, 3329, 3331, 3333, 3335, 3337, 3339, 3341, 3343, 3345, 3347, 3349,
3351, 3353, 3355, 3357, 3359, 3361, 3363, 3365, 3367, 3369, 3371, 3373, 3375,
3377, 3379, 3381, 3383, 3385, 3387, 3389, 3391, 3393, 3395, 3397, 3399, 3401,
3403, 3405, 3407, 3409, 3411, 3413, 3415, 3417, 3419, 3421, 3423, 3425, 3427,
3429, 3431, 3433, 3435, 3437, 3439, 3441, 3443, 3445, 3447, 3449, 3451, 3453,
3455, 3457, 3459, 3461, 3463, 3465, 3467, 3469, 3471, 3473, 3475, 3477, 3479,
3481, 3483, 3485, 3487, 3489, 3491, 3493, 3495, 3497, 3499, 3501, 3503, 3505,
3507, 3509, 3511, 3513, 3515, 3517, 3519, 3521, 3523, 3525, 3527, 3529, 3531,
3533, 3535, 3537, 3539, 3541, 3543, 3545, 3547, 3549, 3551, 3553, 3555, 3557,
3559, 3561, 3563, 3565, 3567, 3569, 3571, 3573, 3575, 3577, 3579, 3581, 3583,
3585, 3587, 3589, 3591, 3593, 3595, 3597, 3599, 3601, 3603, 3605, 3607, 3609,
3611, 3613, 3615, 3617, 3619, 3621, 3623, 3625, 3627, 3629, 3631, 3633, 3635,
3637, 3639, 3641, 3643, 3645, 3647, 3649, 3651, 3653, 3655, 3657, 3659, 3661,
3663, 3665, 3667, 3669, 3671, 3673, 3675, 3677, 3679, 3681, 3683, 3685, 3687,
3689, 3691, 3693, 3695, 3697, 3699, 3701, 3703, 3705, 3707, 3709, 3711, 3713,
3715, 3717, 3719, 3721, 3723, 3725, 3727, 3729, 3731, 3733, 3735, 3737, 3739,
3741, 3743, 3745, 3747, 3749, 3751, 3753, 3755, 3757, 3759, 3761, 3763, 3765,
3767, 3769, 3771, 3773, 3775, 3777, 3779, 3781, 3783, 3785, 3787, 3789, 3791,
3793, 3795, 3797, 3799, 3801, 3803, 3805, 3807, 3809, 3811, 3813, 3815, 3817,
3819, 3821, 3823, 3825, 3827, 3829, 3831, 3833, 3835, 3837, 3839, 3841, 3843,
3845, 3847, 3849, 3851, 3853, 3855, 3857, 3859, 3861, 3863, 3865, 3867, 3869,
3871, 3873, 3875, 3877, 3879, 3881, 3883, 3885, 3887, 3889, 3891, 3893, 3895,
3897, 3899, 3901, 3903, 3905, 3907, 3909, 3911, 3913, 3915, 3917, 3919, 3921,
3923, 3925, 3927, 3929, 3931, 3933, 3935, 3937, 3939, 3941, 3943, 3945, 3947,
3949, 3951, 3953, 3955, 3957, 3959, 3961, 3963, 3965, 3967, 3969, 3971, 3973,
3975, 3977, 3979, 3981, 3983, 3985, 3987, 3989, 3991, 3993, 3995, 3997, 3999,
4001, 4003, 4005, 4007, 4009, 4011, 4013, 4015, 4017, 4019, 4021, 4023, 4025,
4027, 4029, 4031, 4033, 4035, 4037, 4039, 4041, 4043, 4045, 4047, 4049, 4051,
4053, 4055, 4057, 4059, 4061, 4063, 4065, 4067, 4069, 4071, 4073, 4075, 4077,
4079, 4081, 4083, 4085, 4087, 4089, 4091, 4093, 4095, 4097, 4099, 4101, 4103,
4105, 4107, 4109, 4111, 4113, 4115, 4117, 4119, 4121, 4123, 4125, 4127, 4129,
4131, 4133, 4135, 4137, 4139, 4141, 4143, 4145, 4147, 4149, 4151, 4153, 4155,
4157, 4159, 4161, 4163, 4165, 4167, 4169, 4171, 4173, 4175, 4177, 4179, 4181,
4183, 4185, 4187, 4189, 4191, 4193, 4195, 4197, 4199, 4201, 4203, 4205, 4207,
4209, 4211, 4213, 4215, 4217, 4219, 4221, 4223, 4225, 4227, 4229, 4231, 4233,
4235, 4237, 4239, 4241, 4243, 4245, 4247, 4249, 4251, 4253, 4255, 4257, 4259,
4261, 4263, 4265, 4267, 4269, 4271, 4273, 4275, 4277, 4279, 4281, 4283, 4285,
4287, 4289, 4291, 4293, 4295, 4297, 4299, 4301, 4303, 4305, 4307, 4309, 4311,
4313, 4315, 4317, 4319, 4321, 4323, 4325, 4327, 4329, 4331, 4333, 4335, 4337,
4339, 4341, 4343, 4345, 4347, 4349, 4351, 4353, 4355, 4357, 4359, 4361, 4363,
4365, 4367, 4369, 4371, 4373, 4375, 4377, 4379, 4381, 4383, 4385, 4387, 4389,
4391, 4393, 4395, 4397, 4399, 4401, 4403, 4405, 4407, 4409, 4411, 4413, 4415,
4417, 4419, 4421, 4423, 4425, 4427, 4429, 4431, 4433, 4435, 4437, 4439, 4441,

4443, 4445, 4447, 4449, 4451, 4453, 4455, 4457, 4459, 4461, 4463, 4465, 4467,
4469, 4471, 4473, 4475, 4477, 4479, 4481, 4483, 4485, 4487, 4489, 4491, 4493,
4495, 4497, 4499, 4501, 4503, 4505, 4507, 4509, 4511, 4513, 4515, 4517, 4519,
4521, 4523, 4525, 4527, 4529, 4531, 4533, 4535, 4537, 4539, 4541, 4543, 4545,
4547, 4549, 4551, 4553, 4555, 4557, 4559, 4561, 4563, 4565, 4567, 4569, 4571,
4573, 4575, 4577, 4579, 4581, 4583, 4585, 4587, 4589, 4591, 4593, 4595, 4597,
4599, 4601, 4603, 4605, 4607, 4609, 4611, 4613, 4615, 4617, 4619, 4621, 4623,
4625, 4627, 4629, 4631, 4633, 4635, 4637, 4639, 4641, 4643, 4645, 4647, 4649,
4651, 4653, 4655, 4657, 4659, 4661, 4663, 4665, 4667, 4669, 4671, 4673, 4675,
4677, 4679, 4681, 4683, 4685, 4687, 4689, 4691, 4693, 4695, 4697, 4699, 4701,
4703, 4705, 4707, 4709, 4711, 4713, 4715, 4717, 4719, 4721, 4723, 4725, 4727,
4729, 4731, 4733, 4735, 4737, 4739, 4741, 4743, 4745, 4747, 4749, 4751, 4753,
4755, 4757, 4759, 4761, 4763, 4765, 4767, 4769, 4771, 4773, 4775, 4777, 4779,
4781, 4783, 4785, 4787, 4789, 4791, 4793, 4795, 4797, 4799, 4801, 4803, 4805,
4807, 4809, 4811, 4813, 4815, 4817, 4819, 4821, 4823, 4825, 4827, 4829, 4831,
4833, 4835, 4837, 4839, 4841, 4843, 4845, 4847, 4849, 4851, 4853, 4855, 4857,
4859, 4861, 4863, 4865, 4867, 4869, 4871, 4873, 4875, 4877, 4879, 4881, 4883,
4885, 4887, 4889, 4891, 4893, 4895, 4897, 4899, 4901, 4903, 4905, 4907, 4909,
4911, 4913, 4915, 4917, 4919, 4921, 4923, 4925, 4927, 4929, 4931, 4933, 4935,
4937, 4939, 4941, 4943, 4945, 4947, 4949, 4951, 4953, 4955, 4957, 4959, 4961,
4963, 4965, 4967, 4969, 4971, 4973, 4975, 4977, 4979, 4981, 4983, 4985, 4987,
4989, 4991, 4993, 4995, 4997, 4999, 5001, 5003, 5005, 5007, 5009, 5011, 5013,
5015, 5017, 5019, 5021, 5023, 5025, 5027, 5029, 5031, 5033, 5035, 5037, 5039,
5041, 5043, 5045, 5047, 5049, 5051, 5053, 5055, 5057, 5059, 5061, 5063, 5065,
5067, 5069, 5071, 5073, 5075, 5077, 5079, 5081, 5083, 5085, 5087, 5089, 5091,
5093, 5095, 5097, 5099, 5101, 5103, 5105, 5107, 5109, 5111, 5113, 5115, 5117,
5119, 5121, 5123, 5125, 5127, 5129, 5131, 5133, 5135, 5137, 5139, 5141, 5143,
5145, 5147, 5149, 5151, 5153, 5155, 5157, 5159, 5161, 5163, 5165, 5167, 5169,
5171, 5173, 5175, 5177, 5179, 5181, 5183, 5185, 5187, 5189, 5191, 5193, 5195,
5197, 5199, 5201, 5203, 5205, 5207, 5209, 5211, 5213, 5215, 5217, 5219, 5221,
5223, 5225, 5227, 5229, 5231, 5233, 5235, 5237, 5239, 5241, 5243, 5245, 5247,
5249, 5251, 5253, 5255, 5257, 5259, 5261, 5263, 5265, 5267, 5269, 5271, 5273,
5275, 5277, 5279, 5281, 5283, 5285, 5287, 5289, 5291, 5293, 5295, 5297, 5299,
5301, 5303, 5305, 5307, 5309, 5311, 5313, 5315, 5317, 5319, 5321, 5323, 5325,
5327, 5329, 5331, 5333, 5335, 5337, 5339, 5341, 5343, 5345, 5347, 5349, 5351,
5353, 5355, 5357, 5359, 5361, 5363, 5365, 5367, 5369, 5371, 5373, 5375, 5377,
5379, 5381, 5383, 5385, 5387, 5389, 5391, 5393, 5395, 5397, 5399, 5401, 5403,
5405, 5407, 5409, 5411, 5413, 5415, 5417, 5419, 5421, 5423, 5425, 5427, 5429,
5431, 5433, 5435, 5437, 5439, 5441, 5443, 5445, 5447, 5449, 5451, 5453, 5455,
5457, 5459, 5461, 5463, 5465, 5467, 5469, 5471, 5473, 5475, 5477, 5479, 5481,
5483, 5485, 5487, 5489, 5491, 5493, 5495, 5497, 5499, 5501, 5503, 5505, 5507,
5509, 5511, 5513, 5515, 5517, 5519, 5521, 5523, 5525, 5527, 5529, 5531, 5533,
5535, 5537, 5539, 5541, 5543, 5545, 5547, 5549, 5551, 5553, 5555, 5557, 5559,
5561, 5563, 5565, 5567, 5569, 5571, 5573, 5575, 5577, 5579, 5581, 5583, 5585,
5587, 5589, 5591, 5593, 5595, 5597, 5599, 5601, 5603, 5605, 5607, 5609, 5611,
5613, 5615, 5617, 5619, 5621, 5623, 5625, 5627, 5629, 5631, 5633, 5635, 5637,
5639, 5641, 5643, 5645, 5647, 5649, 5651, 5653, 5655, 5657, 5659, 5661, 5663,
5665, 5667, 5669, 5671, 5673, 5675, 5677, 5679, 5681, 5683, 5685, 5687, 5689,
5691, 5693, 5695, 5697, 5699, 5701, 5703, 5705, 5707, 5709, 5711, 5713, 5715,
5717, 5719, 5721, 5723, 5725, 5727, 5729, 5731, 5733, 5735, 5737, 5739, 5741,
5743, 5745, 5747, 5749, 5751, 5753, 5755, 5757, 5759, 5761, 5763, 5765, 5767,
5769, 5771, 5773, 5775, 5777, 5779, 5781, 5783, 5785, 5787, 5789, 5791, 5793,
5795, 5797, 5799, 5801, 5803, 5805, 5807, 5809, 5811, 5813, 5815, 5817, 5819,
5821, 5823, 5825, 5827, 5829, 5831, 5833, 5835, 5837, 5839, 5841, 5843, 5845,
5847, 5849, 5851, 5853, 5855, 5857, 5859, 5861, 5863, 5865, 5867, 5869, 5871,

5873, 5875, 5877, 5879, 5881, 5883, 5885, 5887, 5889, 5891, 5893, 5895, 5897, 5899, 5901, 5903, 5905, 5907, 5909, 5911, 5913, 5915, 5917, 5919, 5921, 5923, 5925, 5927, 5929, 5931, 5933, 5935, 5937, 5939, 5941, 5943, 5945, 5947, 5949, 5951, 5953, 5955, 5957, 5959, 5961, 5963, 5965, 5967, 5969, 5971, 5973, 5975, 5977, 5979, 5981, 5983, 5985, 5987, 5989, 5991, 5993, 5995, 5997, 5999, 6001, 6003, 6005, 6007, 6009, 6011, 6013, 6015, 6017, 6019, 6021, 6023, 6025, 6027, 6029, 6031, 6033, 6035, 6037, 6039, 6041, 6043, 6045, 6047, 6049, 6051, 6053, 6055, 6057, 6059, 6061, 6063, 6065, 6067, 6069, 6071, 6073, 6075, 6077, 6079, 6081, 6083, 6085, 6087, 6089, 6091, 6093, 6095, 6097, 6099, 6101, 6103, 6105, 6107, 6109, 6111, 6113, 6115, 6117, 6119, 6121, 6123, 6125, 6127, 6129, 6131, 6133, 6135, 6137, 6139, 6141, 6143, 6145, 6147, 6149, 6151, 6153, 6155, 6157, 6159, 6161, 6163, 6165, 6167, 6169, 6171, 6173, 6175, 6177, 6179, 6181, 6183, 6185, 6187, 6189, 6191, 6193, 6195, 6197, 6199, 6201, 6203, 6205, 6207, 6209, 6211, 6213, 6215, 6217, 6219, 6221, 6223, 6225, 6227, 6229, 6231, 6233, 6235, 6237, 6239, 6241, 6243, 6245, 6247, 6249, 6251, 6253, 6255, 6257, 6259, 6261, 6263, 6265, 6267, 6269, 6271, 6273, 6275, 6277, 6279, 6281, 6283, 6285, 6287, 6289, 6291, 6293, 6295, 6297, 6299, 6301, 6303, 6305, 6307, 6309, 6311, 6313, 6315, 6317, 6319, 6321, 6323, 6325, 6327, 6329, 6331, 6333, 6335, 6337, 6339, 6341, 6343, 6345, 6347, 6349, 6351, 6353, 6355, 6357, 6359, 6361, 6363, 6365, 6367, 6369, 6371, 6373, 6375, 6377, 6379, 6381, 6383, 6385, 6387, 6389, 6391, 6393, 6395, 6397, 6399, 6401, 6403, 6405, 6407, 6409, 6411, 6413, 6415, 6417, 6419, 6421, 6423, 6425, 6427, 6429, 6431, 6433, 6435, 6437, 6439, 6441, 6443, 6445, 6447, 6449, 6451, 6453, 6455, 6457, 6459, 6461, 6463, 6465, 6467, 6469, 6471, 6473, 6475, 6477, 6479, 6481, 6483, 6485, 6487, 6489, 6491, 6493, 6495, 6497, 6499, 6501, 6503, 6505, 6507, 6509, 6511, 6513, 6515, 6517, 6519, 6521, 6523, 6525, 6527, 6529, 6531, 6533, 6535, 6537, 6539, 6541, 6543, 6545, 6547, 6549, 6551, 6553, 6555, 6557, 6559, 6561, 6563, 6565, 6567, 6569, 6571, 6573, 6575, 6577, 6579, 6581, 6583, 6585, 6587, 6589, 6591, 6593, 6595, 6597, 6599, 6601, 6603, 6605, 6607, 6609, 6611, 6613, 6615, 6617, 6619, 6621, 6623, 6625, 6627, 6629, 6631, 6633, 6635, 6637, 6639, 6641, 6643, 6645, 6647, 6649, 6651, 6653, 6655, 6657, 6659, 6661, 6663, 6665, 6667, 6669, 6671, 6673, 6675, 6677, 6679, 6681, 6683, 6685, 6687, 6689, 6691, 6693, 6695, 6697, 6699, 6701, 6703, 6705, 6707, 6709, 6711, 6713, 6715, 6717, 6719, 6721, 6723, 6725, 6727, 6729, 6731, 6733, 6735, 6737, 6739, 6741, 6743, 6745, 6747, 6749, 6751, 6753, 6755, 6757, 6759, 6761, 6763, 6765, 6767, 6769, 6771, 6773, 6775, 6777, 6779, 6781, 6783, 6785, 6787, 6789, 6791, 6793, 6795, 6797, 6799, 6801, 6803, 6805, 6807, 6809, 6811, 6813, 6815, 6817, 6819, 6821, 6823, 6825, 6827, 6829, 6831, 6833, 6835, 6837, 6839, 6841, 6843, 6845, 6847, 6849, 6851, 6853, 6855, 6857, 6859, 6861, 6863, 6865, 6867, 6869, 6871, 6873, 6875, 6877, 6879, 6881, 6883, 6885, 6887, 6889, 6891, 6893, 6895, 6897, 6899, 6901, 6903, 6905, 6907, 6909, 6911, 6913, 6915, 6917, 6919, 6921, 6923, 6925, 6927, 6929, 6931, 6933, 6935, 6937, 6939, 6941, 6943, 6945, 6947, 6949, 6951, 6953, 6955, 6957, 6959, 6961, 6963, 6965, 6967, 6969, 6971, 6973, 6975, 6977, 6979, 6981, 6983, 6985, 6987, 6989, 6991, 6993, 6995, 6997, 6999, 7001, 7003, 7005, 7007, 7009, 7011, 7013, 7015, 7017, 7019, 7021, 7023, 7025, 7027, 7029, 7031, 7033, 7035, 7037, 7039, 7041, 7043, 7045, 7047, 7049, 7051, 7053, 7055, 7057, 7059, 7061, 7063, 7065, 7067, 7069, 7071, 7073, 7075, 7077, 7079, 7081, 7083, 7085, 7087, 7089, 7091, 7093, 7095, 7097, 7099, 7101, 7103, 7105, 7107, 7109, 7111, 7113, 7115, 7117, 7119, 7121, 7123, 7125, 7127, 7129, 7131, 7133, 7135, 7137, 7139, 7141, 7143, 7145, 7147, 7149, 7151, 7153, 7155, 7157, 7159, 7161, 7163, 7165, 7167, 7169, 7171, 7173, 7175, 7177, 7179, 7181, 7183, 7185, 7187, 7189, 7191, 7193, 7195, 7197, 7199, 7201, 7203, 7205, 7207, 7209, 7211, 7213, 7215, 7217, 7219, 7221, 7223, 7225, 7227, 7229, 7231, 7233, 7235, 7237, 7239, 7241, 7243, 7245, 7247, 7249, 7251, 7253, 7255, 7257, 7259, 7261, 7263, 7265, 7267, 7269, 7271, 7273, 7275, 7277, 7279, 7281, 7283, 7285, 7287, 7289, 7291, 7293, 7295, 7297, 7299, 7301,

7303, 7305, 7307, 7309, 7311, 7313, 7315, 7317, 7319, 7321, 7323, 7325, 7327, 7329, 7331, 7333, 7335, 7337, 7339, 7341, 7343, 7345, 7347, 7349, 7351, 7353, 7355, 7357, 7359, 7361, 7363, 7365, 7367, 7369, 7371, 7373, 7375, 7377, 7379, 7381, 7383, 7385, 7387, 7389, 7391, 7393, 7395, 7397, 7399, 7401, 7403, 7405, 7407, 7409, 7411, 7413, 7415, 7417, 7419, 7421, 7423, 7425, 7427, 7429, 7431, 7433, 7435, 7437, 7439, 7441, 7443, 7445, 7447, 7449, 7451, 7453, 7455, 7457, 7459, 7461, 7463, 7465, 7467, 7469, 7471, 7473, 7475, 7477, 7479, 7481, 7483, 7485, 7487, 7489, 7491, 7493, 7495, 7497, 7499, 7501, 7503, 7505, 7507, 7509, 7511, 7513, 7515, 7517, 7519, 7521, 7523, 7525, 7527, 7529, 7531, 7533, 7535, 7537, 7539, 7541, 7543, 7545, 7547, 7549, 7551, 7553, 7555, 7557, 7559, 7561, 7563, 7565, 7567, 7569, 7571, 7573, 7575, 7577, 7579, 7581, 7583, 7585, 7587, 7589, 7591, 7593, 7595, 7597, 7599, 7601, 7603, 7605, 7607, 7609, 7611, 7613, 7615, 7617, 7619, 7621, 7623, 7625, 7627, 7629, 7631, 7633, 7635, 7637, 7639, 7641, 7643, 7645, 7647, 7649, 7651, 7653, 7655, 7657, 7659, 7661, 7663, 7665, 7667, 7669, 7671, 7673, 7675, 7677, 7679, 7681, 7683, 7685, 7687, 7689, 7691, 7693, 7695, 7697, 7699, 7701, 7703, 7705, 7707, 7709, 7711, 7713, 7715, 7717, 7719, 7721, 7723, 7725, 7727, 7729, 7731, 7733, 7735, 7737, 7739, 7741, 7743, 7745, 7747, 7749, 7751, 7753, 7755, 7757, 7759, 7761, 7763, 7765, 7767, 7769, 7771, 7773, 7775, 7777, 7779, 7781, 7783, 7785, 7787, 7789, 7791, 7793, 7795, 7797, 7799, 7801, 7803, 7805, 7807, 7809, 7811, 7813, 7815, 7817, 7819, 7821, 7823, 7825, 7827, 7829, 7831, 7833, 7835, 7837, 7839, 7841, 7843, 7845, 7847, 7849, 7851, 7853, 7855, 7857, 7859, 7861, 7863, 7865, 7867, 7869, 7871, 7873, 7875, 7877, 7879, 7881, 7883, 7885, 7887, 7889, 7891, 7893, 7895, 7897, 7899, 7901, 7903, 7905, 7907, 7909, 7911, 7913, 7915, 7917, 7919, 7921, 7923, 7925, 7927, 7929, 7931, 7933, 7935, 7937, 7939, 7941, 7943, 7945, 7947, 7949, 7951, 7953, 7955, 7957, 7959, 7961, 7963, 7965, 7967, 7969, 7971, 7973, 7975, 7977, 7979, 7981, 7983, 7985, 7987, 7989, 7991, 7993, 7995, 7997, 7999, 8001, 8003, 8005, 8007, 8009, 8011, 8013, 8015, 8017, 8019, 8021, 8023, 8025, 8027, 8029, 8031, 8033, 8035, 8037, 8039, 8041, 8043, 8045, 8047, 8049, 8051, 8053, 8055, 8057, 8059, 8061, 8063, 8065, 8067, 8069, 8071, 8073, 8075, 8077, 8079, 8081, 8083, 8085, 8087, 8089, 8091, 8093, 8095, 8097, 8099, 8101, 8103, 8105, 8107, 8109, 8111, 8113, 8115, 8117, 8119, 8121, 8123, 8125, 8127, 8129, 8131, 8133, 8135, 8137, 8139, 8141, 8143, 8145, 8147, 8149, 8151, 8153, 8155, 8157, 8159, 8161, 8163, 8165, 8167, 8169, 8171, 8173, 8175, 8177, 8179, 8181, 8183, 8185, 8187, 8189, 8191, 8193, 8195, 8197, 8199, 8201, 8203, 8205, 8207, 8209, 8211, 8213, 8215, 8217, 8219, 8221, 8223, 8225, 8227, 8229, 8231, 8233, 8235, 8237, 8239, 8241, 8243, 8245, 8247, 8249, 8251, 8253, 8255, 8257, 8259, 8261, 8263, 8265, 8267, 8269, 8271, 8273, 8275, 8277, 8279, 8281, 8283, 8285, 8287, 8289, 8291, 8293, 8295, 8297, 8299, 8301, 8303, 8305, 8307, 8309, 8311, 8313, 8315, 8317, 8319, 8321, 8323, 8325, 8327, 8329, 8331, 8333, 8335, 8337, 8339, 8341, 8343, 8345, 8347, 8349, 8351, 8353, 8355, 8357, 8359, 8361, 8363, 8365, 8367, 8369, 8371, 8373, 8375, 8377, 8379, 8381, 8383, 8385, 8387, 8389, 8391, 8393, 8395, 8397, 8399, 8401, 8403, 8405, 8407, 8409, 8411, 8413, 8415, 8417, 8419, 8421, 8423, 8425, 8427, 8429, 8431, 8433, 8435, 8437, 8439, 8441, 8443, 8445, 8447, 8449, 8451, 8453, 8455, 8457, 8459, 8461, 8463, 8465, 8467, 8469, 8471, 8473, 8475, 8477, 8479, 8481, 8483, 8485, 8487, 8489, 8491, 8493, 8495, 8497, 8499, 8501, 8503, 8505, 8507, 8509, 8511, 8513, 8515, 8517, 8519, 8521, 8523, 8525, 8527, 8529, 8531, 8533, 8535, 8537, 8539, 8541, 8543, 8545, 8547, 8549, 8551, 8553, 8555, 8557, 8559, 8561, 8563, 8565, 8567, 8569, 8571, 8573, 8575, 8577, 8579, 8581, 8583, 8585, 8587, 8589, 8591, 8593, 8595, 8597, 8599, 8601, 8603, 8605, 8607, 8609, 8611, 8613, 8615, 8617, 8619, 8621, 8623, 8625, 8627, 8629, 8631, 8633, 8635, 8637, 8639, 8641, 8643, 8645, 8647, 8649, 8651, 8653, 8655, 8657, 8659, 8661, 8663, 8665, 8667, 8669, 8671, 8673, 8675, 8677, 8679, 8681, 8683, 8685, 8687, 8689, 8691, 8693, 8695, 8697, 8699, 8701, 8703, 8705, 8707, 8709, 8711, 8713, 8715, 8717, 8719, 8721, 8723, 8725, 8727, 8729, 8731,

8733, 8735, 8737, 8739, 8741, 8743, 8745, 8747, 8749, 8751, 8753, 8755, 8757, 8759, 8761, 8763, 8765, 8767, 8769, 8771, 8773, 8775, 8777, 8779, 8781, 8783, 8785, 8787, 8789, 8791, 8793, 8795, 8797, 8799, 8801, 8803, 8805, 8807, 8809, 8811, 8813, 8815, 8817, 8819, 8821, 8823, 8825, 8827, 8829, 8831, 8833, 8835, 8837, 8839, 8841, 8843, 8845, 8847, 8849, 8851, 8853, 8855, 8857, 8859, 8861, 8863, 8865, 8867, 8869, 8871, 8873, 8875, 8877, 8879, 8881, 8883, 8885, 8887, 8889, 8891, 8893, 8895, 8897, 8899, 8901, 8903, 8905, 8907, 8909, 8911, 8913, 8915, 8917, 8919, 8921, 8923, 8925, 8927, 8929, 8931, 8933, 8935, 8937, 8939, 8941, 8943, 8945, 8947, 8949, 8951, 8953, 8955, 8957, 8959, 8961, 8963, 8965, 8967, 8969, 8971, 8973, 8975, 8977, 8979, 8981, 8983, 8985, 8987, 8989, 8991, 8993, 8995, 8997, 8999, 9001, 9003, 9005, 9007, 9009, 9011, 9013, 9015, 9017, 9019, 9021, 9023, 9025, 9027, 9029, 9031, 9033, 9035, 9037, 9039, 9041, 9043, 9045, 9047, 9049, 9051, 9053, 9055, 9057, 9059, 9061, 9063, 9065, 9067, 9069, 9071, 9073, 9075, 9077, 9079, 9081, 9083, 9085, 9087, 9089, 9091, 9093, 9095, 9097, 9099, 9101, 9103, 9105, 9107, 9109, 9111, 9113, 9115, 9117, 9119, 9121, 9123, 9125, 9127, 9129, 9131, 9133, 9135, 9137, 9139, 9141, 9143, 9145, 9147, 9149, 9151, 9153, 9155, 9157, 9159, 9161, 9163, 9165, 9167, 9169, 9171, 9173, 9175, 9177, 9179, 9181, 9183, 9185, 9187, 9189, 9191, 9193, 9195, 9197, 9199, 9201, 9203, 9205, 9207, 9209, 9211, 9213, 9215, 9217, 9219, 9221, 9223, 9225, 9227, 9229, 9231, 9233, 9235, 9237, 9239, 9241, 9243, 9245, 9247, 9249, 9251, 9253, 9255, 9257, 9259, 9261, 9263, 9265, 9267, 9269, 9271, 9273, 9275, 9277, 9279, 9281, 9283, 9285, 9287, 9289, 9291, 9293, 9295, 9297, 9299, 9301, 9303, 9305, 9307, 9309, 9311, 9313, 9315, 9317, 9319, 9321, 9323, 9325, 9327, 9329, 9331, 9333, 9335, 9337, 9339, 9341, 9343, 9345, 9347, 9349, 9351, 9353, 9355, 9357, 9359, 9361, 9363, 9365, 9367, 9369, 9371, 9373, 9375, 9377, 9379, 9381, 9383, 9385, 9387, 9389, 9391, 9393, 9395, 9397, 9399, 9401, 9403, 9405, 9407, 9409, 9411, 9413, 9415, 9417, 9419, 9421, 9423, 9425, 9427, 9429, 9431, 9433, 9435, 9437, 9439, 9441, 9443, 9445, 9447, 9449, 9451, 9453, 9455, 9457, 9459, 9461, 9463, 9465, 9467, 9469, 9471, 9473, 9475, 9477, 9479, 9481, 9483, 9485, 9487, 9489, 9491, 9493, 9495, 9497, 9499, 9501, 9503, 9505, 9507, 9509, 9511, 9513, 9515, 9517, 9519, 9521, 9523, 9525, 9527, 9529, 9531, 9533, 9535, 9537, 9539, 9541, 9543, 9545, 9547, 9549, 9551, 9553, 9555, 9557, 9559, 9561, 9563, 9565, 9567, 9569, 9571, 9573, 9575, 9577, 9579, 9581, 9583, 9585, 9587, 9589, 9591, 9593, 9595, 9597, 9599, 9601, 9603, 9605, 9607, 9609, 9611, 9613, 9615, 9617, 9619, 9621, 9623, 9625, 9627, 9629, 9631, 9633, 9635, 9637, 9639, 9641, 9643, 9645, 9647, 9649, 9651, 9653, 9655, 9657, 9659, 9661, 9663, 9665, 9667, 9669, 9671, 9673, 9675, 9677, 9679, 9681, 9683, 9685, 9687, 9689, 9691, 9693, 9695, 9697, 9699, 9701, 9703, 9705, 9707, 9709, 9711, 9713, 9715, 9717, 9719, 9721, 9723, 9725, 9727, 9729, 9731, 9733, 9735, 9737, 9739, 9741, 9743, 9745, 9747, 9749, 9751, 9753, 9755, 9757, 9759, 9761, 9763, 9765, 9767, 9769, 9771, 9773, 9775, 9777, 9779, 9781, 9783, 9785, 9787, 9789, 9791, 9793, 9795, 9797, 9799, 9801, 9803, 9805, 9807, 9809, 9811, 9813, 9815, 9817, 9819, 9821, 9823, 9825, 9827, 9829, 9831, 9833, 9835, 9837, 9839, 9841, 9843, 9845, 9847, 9849, 9851, 9853, 9855, 9857, 9859, 9861, 9863, 9865, 9867, 9869, 9871, 9873, 9875, 9877, 9879, 9881, 9883, 9885, 9887, 9889, 9891, 9893, 9895, 9897, 9899, 9901, 9903, 9905, 9907, 9909, 9911, 9913, 9915, 9917, 9919, 9921, 9923, 9925, 9927, 9929, 9931, 9933, 9935, 9937, 9939, 9941, 9943, 9945, 9947, 9949, 9951, 9953, 9955, 9957, 9959, 9961, 9963, 9965, 9967, 9969, 9971, 9973, 9975, 9977, 9979, 9981, 9983, 9985, 9987, 9989, 9991, 9993, 9995, 9997, 9999]

Output

Input 3

```
1 [45, 47, 49, 51, 53, 55, 57, 59, 61, 63, 65, 67, 69, 71, 73, 75, 77, 79, 81,
  83, 85, 87, 89, 91, 93, 95, 97, 99, 101, 103, 105, 107, 109, 111, 113, 115,
  117, 119, 121, 123, 125, 127, 129, 131, 133, 135, 137, 139, 141, 143, 145,
  147, 149, 151, 153, 155, 157, 159, 161, 163, 165, 167, 169, 171, 173, 175,
  177, 179, 181, 183, 185, 187, 189, 191, 193, 195, 197, 199]
2 [16, 18, 20, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, 44, 46, 48, 50, 52,
  54, 56, 58, 60, 62, 64, 66, 68, 70, 72, 74, 76, 78, 80, 82, 84, 86, 88, 90,
  92, 94, 96, 98, 100, 102, 104, 106, 108, 110, 112, 114]
3 10
```

Output

```
1 34
```

Problem 3

Write a function **pickingNumbers(a)** that accept a list `a` and return the length of the longest set of element where the absolute difference between any two elements is less than or equal to 1.

Sample input

```
1 [4 6 5 3 3 1]
```

Output

```
1 3
```

There are [4 3 3] element meeting the certain criterion.

Solution

Solution Code

```
1 def pickingNumbers(a):
2     a.sort()
3     count=1
4     pos=0
5     maxx=0
6     for i in range(1,len(a)):
7         if(abs(a[i]-a[pos])<=1):
8             count=count+1
9         else:
10            if(count>maxx):
11                maxx=count
12                count=1
13                pos=i
14    if(maxx>count):
15        return maxx
16    else:
```

```
17 |         return count
```

Suffix code(Visible)

```
1 | a=[int(item) for item in input().split(" ")]
2 | print(pickingNumbers(a))
```

Public Test case

Input 1

```
1 | 4 6 5 3 3 1
```

Output

```
1 | 3
```

Input 2

```
1 | 9 6 13 16 5 18 4 10 3 19 4 5 8 1 13 10 20 17 15 10 6 10 13 20 18 17 7 10 6 5
   | 16 18 13 20 19 7 16 13 20 17 4 17 8 19 12 7 17 1 18 3 16 4 5 3 15 17 6 17 14
   | 11 11 7 11 6 15 15 12 6 17 19 8 6 13 9 10 19 14 18 7 9 11 16 11 20 4 20 10 7
   | 8 4 2 12 11 8 12 13 19 8 8 5
```

Output

```
1 | 13
```

Input 3

```
1 | 14 18 17 10 9 20 4 13 19 19 8 15 15 17 6 5 15 12 18 2 18 7 20 8 2 8 11 2 16 2
   | 12 9 3 6 9 9 13 7 4 6 19 7 2 4 3 4 14 3 4 9 17 9 4 20 10 16 12 1 16 4 15 15 9
   | 13 6 3 8 4 7 14 16 18 20 11 20 14 20 12 15 4 5 10 10 20 11 18 5 20 13 4 18 1
   | 14 3 20 19 14 2 5 13
```

Output

```
1 | 15
```

Private Test case

Input 1

```
1 | 4 97 5 97 97 4 97 4 97 97 97 97 4 4 5 5 97 5 97 99 4 97 5 97 97 97 5 5 97 4 5
   | 97 97 5 97 4 97 5 4 4 97 5 5 5 4 97 97 4 97 5 4 4 97 97 97 5 5 97 4 97 97 5 4
   | 97 97 4 97 97 97 5 4 4 97 4 4 97 5 97 97 97 97 4 97 5 97 5 4 97 4 5 97 97 5
   | 97 5 97 5 97 97 97
```

Output

1 | 50

Input 2

[illegible]

Output

1 | 100

Input 3

[illegible]

Output

1 | 30

Week 9 Live coding Solution

Week 9 Live coding Solution

Problem 1

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Problem 2

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Problem 3

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Problem 4

[Solution](#)

[Public Test case](#)

[Private Test case](#)

Problem 1

There are N stones, numbered $0, 1, 2, \dots, N - 1$. For each i ($0 \leq i \leq N - 1$), the height of Stone i is h_i .

There is a frog who is initially on Stone 0. He will repeat the following action some number of times to reach last stone.

If the frog is currently on Stone i , can jump to Stone $i + 1$ or Stone $i + 2$. Here, a cost of $|h_i - h_j|$ is incurred, where j is the stone to land on.

Find the minimum possible total cost to reach at last stone.

Write a function **minCost(H)**, where H is a list of heights for N stones. The function returns the minimum possible total cost to reach at last stone.

Sample Input

```
1 | [10 30 40 20]
```

Output

```
1 | 30
```

Explanation

If we follow the path $0 \rightarrow 1 \rightarrow 3$, the total cost incurred would be $|10 - 30| + |30 - 20| = 30$ $|10 - 30| + |30 - 20| = 30$.

Solution

Recursive

```
1 def solver(n,height):
2     if n == 0:
3         ans = 0
4     elif n == 1:
5         ans = abs(height[1]-height[0])
6     elif n > 1:
7         ans = min(solver(n-1,height)+abs(height[n]-height[n-1]),solver(n-2,height)+abs(height[n]-height[n-2]))
8     return ans
9 def minCost(H):
10    return solver(len(H)-1,H)
```

DP Memoization (Top down approach)

```
1 def solvem(n,height,memo):
2     if memo[n]==-1:
3         if n == 0:
4             ans = 0
5         elif n == 1:
6             ans = abs(height[1]-height[0])
7         elif n > 1:
8             ans = min(solvem(n-1,height,memo)+abs(height[n]-height[n-1]),solvem(n-2,height,memo)+abs(height[n]-height[n-2]))
9             memo[n]=ans
10    return memo[n]
11
12 def minCost(H):
13     memo={}
14     for i in range(len(H)):
15         memo[i]=-1
16    return solvem(len(H)-1,H,memo)
```

DP Tabular (Bottom-up approach)

```

1  def solvet(N, h):
2      dp = [0]*N
3      dp[1] = abs(h[1] - h[0])
4
5      for i in range(2, N):
6          dp[i] = min(dp[i-1] + abs(h[i-1] - h[i]), dp[i-2] + abs(h[i-2] -
7                      h[i]))
8
9      return dp[N-1]
10 def minCost(h):
11     N = len(h)
12     return solvet(N, h)

```

Prefix Code

```

1  H = eval(input())
2  print(minCost(H))

```

Public Test case

Input 1

```

1  [10, 30, 40, 20]

```

Output

```

1  30

```

Input 2

```

1  [10, 10]

```

Output

```

1  0

```

Input 3

```

1
2  [30, 10, 60, 10, 60, 50]

```

Output

```

1  40

```

Private Test case

Input 1

1 | [1, 2, 3, 4, 5, 6, 7, 8, 9]

Output

1 | 8

Input 2

1 | [1, 2, 2, 3, 3, 4, 4, 5, 5]

Output

1 | 4

Input 3

1 | [1, 2, 3, 4, 5, 5, 5, 5, 5]

Output

1 | 4

Problem 2

Count Subsequence

A **subsequence** is a sequence that can be derived from another sequence by deleting some elements without changing the order of the remaining elements.

Write a function **countSubseq(S)** that accepts a string **S** which contains only digit characters. The function returns the number of non-empty subsequences that can be obtained from **S** such that every digit in the subsequence is strictly greater than all previous digits(if exist).

Example:-

If **S = '7598'** then there are **8** subsequences which follow the above constraint. These are **'7', '5', '9', '8', '79', '78', '59', '58'**. Notice that **'7598'** is not a valid required subsequence because **7 > 5** and **9 > 8**.

Input

```
1 | 7598
```

Output

```
1 | 8
```

Solution

Solution Code

```
1 def countSubseq(S):
2     L=[]
3     n = len(S)
4     for d in S:
5         L.append(int(d))
6     count = [0 for i in range(10)]
7     for i in range(n):
8         for j in range(L[i] - 1, -1, -1):
9             count[L[i]] += count[j]
10        count[L[i]] += 1
11    result = 0
12    for i in range(10):
13        result += count[i]
14    return result
```

Suffix code(Visible)

```
1 #Suffix Code
2 s = input()
3 print(countSubseq(s))
```

Public Test case

Input 1

```
1 | 7598
```

Output

```
1 | 8
```

Input 2

```
1 | 111324355
```

Output

1 | 95

Input 3

1 | 1123

Output

1 | 11

Input 4

1 | 54321

Output

1 | 5

Private Test case

Input 1

1 | 543216

Output

1 | 11

Input 2

1 | 6458132

Output

1 | 14

Input 3

1 | 1653587269

Output

1 | 99

Input 4

1 | 546766112378

Output

```
1 | 103
```

Input 5

```
1 | 987654321
```

Output

```
1 | 9
```

Problem 3

You are given weights and values of `N` items, put these items in a knapsack of capacity `W` to get the maximum total value in the knapsack. Note that we have only one quantity of each item. In other words, given two integer list `value[0..N-1]` and `weight[0..N-1]` which represent values and weights associated with `N` items respectively. Also given an integer `W` which represents knapsack capacity, find out the maximum `value` subset of value such that sum of the weights of this subset is smaller than or equal to capacity `W`. You cannot break an item, either pick the complete item or don't pick it (0-1 property).

Write the function `knapsack(w, weight, value, N)` that returns the maximum possible value you can get.

Sample Input

```
1 | 3 #N
2 | 4 #W
3 | [4,5,1] #weight
4 | [1,20,3] #value
```

Output:

```
1 | 3
```

Solution

Solution Code

```

1 def knapSack(W, weight, value, N):
2     st = [[0 for i in range(W+1)] for j in range(N+1)]
3     for i in range(1,N+1):
4         for j in range(1,W+1):
5             if (weight[i-1]<=j):
6                 st[i][j]=max(value[i-1]+st[i-1][j-weight[i-1]],st[i-1][j])
7             else:
8                 st[i][j]=st[i-1][j]
9     return st[N][W]

```

Suffix Code

```

1 N=int(input())
2 W=int(input())
3 weight=eval(input())
4 values=eval(input())
5 print(knapSack(W,weight,values,N))

```

Public Test case

Input 1

```

1 3
2 4
3 [4,5,1]
4 [1,20,3]

```

Output

```

1 3

```

Input 2

```

1 3
2 3
3 [4,5,6]
4 [1,2,3]

```

Output

```

1 0

```

Input 3

```

1 6
2 10
3 [4,4,5,6,7,2]
4 [50,40,60,6,91,2]

```

Output

```
1 | 110
```

Private Test case

Input 1

```
1 | 6
2 | 8
3 | [4,4,5,6,7,2]
4 | [60,40,60,90,108,30]
```

Output

```
1 | 120
```

Input 2

```
1 | 6
2 | 10
3 | [1, 2, 3, 8, 7, 4]
4 | [20, 5, 10, 40, 15, 25]
```

Output

```
1 | 60
```

Input 3

```
1 | 8
2 | 100
3 | [25, 35, 30, 46, 12, 65, 19, 32]
4 | [22, 34, 56, 77, 86, 12, 33, 60]
```

Output

```
1 | 235
```

Input 4

```
1 | 8
2 | 50
3 | [20, 30, 22, 10, 33, 19, 20, 40]
4 | [34, 56, 78, 23, 45, 70, 67, 45]
```

Output

Problem 4

Given a rod of length `n` inches and an list of prices `price` that contains prices of all pieces of size smaller or equal `n`. Determine the maximum value obtainable by cutting up the rod and selling the pieces.

Write a function `cutRod(n,price)` that return the he maximum value obtainable by cutting up the rod and selling the pieces.

Sample Input

```
1 8 #n
2 [1, 5, 8, 9, 10, 17, 17, 20] #price
```

Output

```
1 22 #maximum value
```

Explanation:

The maximum obtainable value is 22 by cutting in two pieces of lengths 2 and 6, i.e., $5+17=22$.

Solution

Solution code

```
1 def cutRod(n,price):
2     length=[]
3     st=[[0 for i in range(n+1)] for j in range(n+1)]
4     for i in range(1,n+1):
5         length.append(i)
6         for i in range(1,n+1):
7             for j in range(1,n+1):
8                 if(length[i-1]<=j):
9                     st[i][j]=max(price[i-1]+st[i][j-length[i-1]],st[i-1][j])
10                else:
11                    st[i][j]=st[i-1][j]
12    return st[n][n]
```

Suffix code (visible)

```
1 N = int(input())
2 price= eval(input())
3 print(cutRod(N,price))
```

Public Test case

Input 1

| | | |
|---|--|------------------------------|
| 1 | | 8 |
| 2 | | [1, 5, 8, 9, 10, 17, 17, 20] |

Output

| | | |
|---|--|----|
| 1 | | 22 |
|---|--|----|

Input 2

| | | |
|---|--|-------------------------------|
| 1 | | 8 |
| 2 | | [10, 5, 8, 9, 10, 17, 17, 20] |

Output

| | | |
|---|--|----|
| 1 | | 80 |
|---|--|----|

Input 3

| | | |
|---|--|------------------------------|
| 1 | | 8 |
| 2 | | [1, 5, 8, 9, 10, 17, 17, 25] |

Output

| | | |
|---|--|----|
| 1 | | 25 |
|---|--|----|

Private Test case

Input 1

| | | |
|---|--|------------------------|
| 1 | | 10 |
| 2 | | [1,2,3,4,5,6,7,8,9,10] |

Output

| | | |
|---|--|----|
| 1 | | 10 |
|---|--|----|

Input 2

| | | |
|---|--|---------------------------|
| 1 | | 10 |
| 2 | | [2,1,10,20,5,16,7,8,9,10] |

Output

| | | |
|---|--|----|
| 1 | | 44 |
|---|--|----|

Input 3

| | | |
|---|--|----|
| 1 | | 10 |
|---|--|----|

| | | |
|---|--|---------------------------|
| 2 | | [2,1,10,2,50,16,7,8,9,10] |
|---|--|---------------------------|

Output

| | | |
|---|--|-----|
| 1 | | 100 |
|---|--|-----|