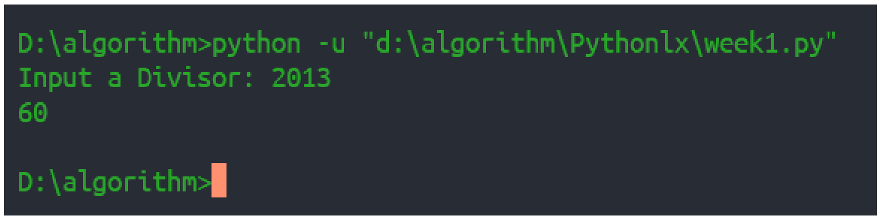
被2013整除

Python代码即截图

```python
n = int(input("Input a Divisor: "))
i = 1;
while int('1' * i) % n:
  i += 1
print(i)
```

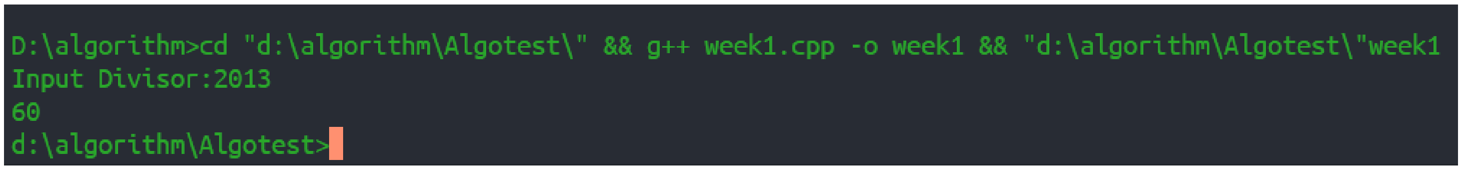


```
D:\algorithm>python -u "d:\algorithm\Pythonlx\week1.py"
Input a Divisor: 2013
60

D:\algorithm>
```

C++代码即截图

```cpp
#include <iostream>
using namespace std;
int main() {
  int n; //除数
  cout << "Input Divisor:";
  cin >> n;
  int div = n % 10;
  while (div != 1 && div != 3 && div != 7 && div != 9)
  {
    cout << "Can't, Input again!";
    cin >> n;
  }
  int num = 1;
  int length = 1;
  while (num % n) {
    length ++;
    num = (num % n) * 10 + 1;
  }
  cout << length;
  return 0;
}
```



```
D:\algorithm>cd "d:\algorithm\Algotest\" && g++ week1.cpp -o week1 && "d:\algorithm\Algotest\"week1
Input Divisor:2013
60
d:\algorithm\Algotest>
```

伪代码描述欧几里得

```
a , b a < b
while (b!=0) {
  if(a > b)
    a = a-b; //取 a mod b
  else
    b = b-a; //取 b mod a
}
```

查找

给定升序排列的数组A[1] A[2] A[3]......A[n]其元素值两两不相等，找出所有A[i] = i

- **折半: O(log(n))**
    - 整数情况

      ```
      L = 1; R = n; mid = (L+R)/2;
      LOOP:
      if A[mid] < 0 && A[mid+1] == 0
        return mid+1;
      if A[mid] > mid
        L = mid
      else R = mid
      ```

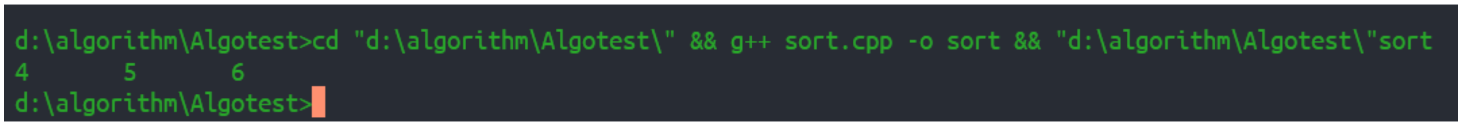
      以A[i]-i来看，整数情况下一般分三个部分，左边<0,中间=0,右边>0,二分查找到左边界后向右输出直至 A[index]-index != 0为止。
    - float, double

      ```
      for(A[1] - A[n])
        if(A[i] == i) cout << i;
      ```

      小数情况下A[i] = i可出现在多个位置且不定，采用遍历复杂度O(n)

最终用程序

```cpp
#include <iostream>
using namespace std;
int test2(int b[], int length);
int main() {
  int A[]={-3, -2, -1, 2, 4, 5, 6, 9, 11};
  int length = sizeof(A)/sizeof(int);
  int flag;
  flag = test2(A, length);
  if (flag != -1) {
    while (A[flag] == flag) {
      printf("%d\t", flag);
      flag++;
    }
  }
  else {
    printf("no!");
  }
  return 0;
}
int test2(int b[], int length) {
  int l = 0, r = length-1, mid;
  while (l <= r) {
    mid = l + r>>1;
    if (mid == 0 && b[mid] == mid) {
      return 0;
    }
    if (b[mid]-mid < 0 && b[mid+1] - mid == 1) {
      return mid+1;
    }
    if (b[mid]-mid >= 0) {
      r = mid-1;
    }
    else {
      l = mid+1;
    }
  }
  return -1;
}
```



```
d:\algorithm\Algotest>cd "d:\algorithm\Algotest\" && g++ sort.cpp -o sort && "d:\algorithm\Algotest\"sort
4       5       6
d:\algorithm\Algotest>
```