

**INTERMEDIATE DIVISION
PRIME TIME**

PROBLEM: Mathematically, the topic of prime numbers is and has been since ancient times a very interesting area of study. In this problem you will investigate prime numbers and the prime-power factorization of numbers.

A **circular prime** is a prime number that will remain a prime on any cyclic rotation of its digits. As an example 1193, 1931, 9311 and 3119 are all primes.

A **deleted prime** is a prime number that will remain a prime if the leftmost digit, or the rightmost digit or one interior digit, if any, is truncated. As examples: 113 becomes 13 if the left most digit is truncated. It is a left deleted prime. Again 113 becomes 11 if the rightmost digit is truncated. It is also a right deleted prime. Further, 113 becomes 13 when the middle 1 is truncated. Primes of this type are called interior deleted primes. For this program, a prime will be classified as interior deleted, if any one of its interior digits is deleted and the resulting integer is a prime.

Smith Numbers – Primes are so interesting that a mathematician while making a telephone call to his brother-in-law noted that the sum of the digits of the phone number equaled the sum of the digits of its prime factors. The mathematician went on to study this phenomenon. The brother-in-law was named Smith and the numbers described above are known as Smith Numbers. As an example the phone number was 493-7775.

$$4937775 = 3 * 5 * 5 * 65837$$

$$4 + 9 + 3 + 7 + 7 + 7 + 5 = 3 + 5 + 5 + 6 + 5 + 8 + 3 + 7$$

INPUT: The input will consist of 5 integers

OUTPUT: For each input, determine if the integer is prime or composite. If it is prime, determine if it is a circular, left, interior or right deleted prime. Since all primes are Smith Numbers, determine if the composite number is a Smith Number. If an integer has none of the above properties, print NONE.

SAMPLE INPUT

1. 113
2. 523
3. 45673
4. 6047
5. 121
6. 19

SAMPLE OUTPUT

1. Circular, Left, Interior, Right
2. Left, Interior
3. Right, Interior
4. Left, Interior
5. Smith
6. NONE