## 7. KAPREKAR ROUTINE
## 10 POINTS

**PROBLEM:** In 1949, D. R. Kaprekar worked with integers and applied a process to them. His technique also can be used with any base and any number. The process is similar to the idea of palindromes that we did earlier in the year but with a twist. The procedure is as follows: given a number, rewrite the digits in descending and ascending order. Subtract the ascending order from the descending order. Continue this process until you reach 0, a constant, or start a cycle over. For example given BA2D base 16:

DBA2-2ABD = B0E5
EB50-5BE = E592
E952-259E=C3B4
CB43-34BC=9687
9876-6789=30ED
ED30-3DE=E952 This creates a cycle of length 4.

**INPUT:** There will be 10 inputs. Each input will be a base 16 integer that must be entered as a single string.

**OUTPUT:** After applying the process described above:
If the result is a zero, print ZERO followed by the number of subtractions
If the result is a constant, print CONSTANT and the number that repeats
If the result is a cycle, print CYCLE followed by the length of the cycle
(lengths will all be greater than 1).

| **SAMPLE INPUT** | **SAMPLE OUTPUT** |
|---|---|
| 1. BA2D | 1. CYCLE, 4 |
| 2. AB9 | 2. CONSTANT, 7F8 |
| 3. AAA | 3. ZERO, 1 |