ACSL

**American Computer Science League**

**2012 - 2013**

#### All-Star #3

**All-Star Cells**

**PROBLEM:** The ACSL cell always has 8 bits. The bits are always some combination of the bit groups A, B, C, D, E, F, G, and H. The cell has mathematical operations as listed below:

DIVIDE – The cell divides into two cells with one cell taking the first four bits and the second cell taking the last four bits. The bit groups each replicate and concatenate to get back to eight bits each.

e.g. DIV AHBGCEDF becomes AHBGAHBG and CEDFCEDF

ADDn - The first n (0 ≤ n ≤ 4) bits replicate and are concatenated to the first n bits. The last n bits are deleted. Remaining bits are concatenated on the right.

e.g. ADD3 AHBGCEDF becomes AHBAHBGC

SUBTRACTn - The first n (0 ≤ n ≤ 4) bits are deleted and the last n bits replicate, are put in alphabetic order and then are concatenated on the right.

e.g. SUB3 AHBGCEDF becomes GCEDFDEF

UNION - Two cells become one by deleting the first four bits of the first cell and the last four bits of the second cell. The remaining bit groups in each cell are put in alphabetical order and concatenated.  
  
 e.g. UNI AHBGCEDF AGBHCFED becomes CDEFABGH

INTERSECT - Two cells become one by deleting the middle four bits of the first cell and the middle four bits of the second cell. The remaining bit groups are each put in alphabetical order and concatenated

e.g. INT AHBGCEDF AGBHCFED becomes ADFHADEG

ALIGN – The eight bits are put in reverse alphabetical order.

e.g. ALI AHBGCEDF becomes HGFEDCBA

There will be 3 cells used: X, Y, and Z. They will be given on the first 3 input lines.

The cells are operated on as a list with the operations being performed from right to left. Operators and cells will be separated by a space.

e.g. SUB3 ALI AHBGCEDF becomes EDCBAABC

**INPUT:** There will be 13 lines of input. The first 3 lines will each contain the an 8-character string giving the 8 bit groups for X, Y and Z in that order. The next 10 lines will each contain a list with at most 3 operations. Of these the first 4 lines will only contain one operation. All lines must be entered as single strings.

**OUTPUT:** For each list print the final output of the operation(s).

SAMPLE INPUT SAMPLE OUTPUT

1. ABCDEFGH 1. ABCDABCD and EFGHEFGH
2. AAGGHDFE 2. HGGFEDAA
3. GHAFFEDB 3. GHGHAFFE
4. DIV X 4. CDEFGHGH
5. ALI Y 5. AAAGAAAG and GHDFGHDF
6. ADD2 Z 6. DEFHAFGH
7. SUB2 X 7. BDGHABGH
8. DIV ADD1 Y 8. GFEDCBAA
9. UNI Y Z 9. DFGHAGGH
10. INT Z X 10. FFEFFEDB
11. ALI ADD1 X
12. UNI ADD1 Y SUB1 Y
13. ADD3 SUB2 ALI Z

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TEST DATA**

**TEST INPUT TEST OUTPUT**

1. DGFAHCEB 1. BAGABAGA and FEHEFEHE
2. BAGAFEHE 2. CAFECAFE
3. CAFEFEED 3. DGFAHCEB
4. DIV Y 4. FFEEEDCA
5. ADD4 Z 5. BCEHABBG
6. SUB0 X 6. ACDECEHH
7. ALI Z 7. GFEEDBAA
8. UNI X ADD1 Y 8. AFGHAEFH
9. INT Z SUB4 X 9. ECCAACCE
10. ALI UNI Z ADD0 Y 10. AAFGACDE
11. UNI ADD3 X SUB3 Y
12. SUB4 ALI ADD1 Z
13. INT ALI ADD2 Y Z