

Pythagorean Triples

Due on 2014-09-16, 23:59 IST

Level: Easy

Three numbers form a Pythagorean triple if the sum of squares of two numbers is equal to the square of the third.

For example, 3, 5 and 4 form a Pythagorean triple, since $3^2 + 4^2 = 25 = 5^2$

You are given three integers, a, b, and c. They need not be given in increasing order. If they form a Pythagorean triple, then print "yes", otherwise, print "no". Please note that the output message is in small letters.

Sample Input

3
5
4

Sample Output

yes

Sample Test Cases

| | Input | Output |
|-------------|----------------------|--------|
| Test Case 1 | 3 5 4 | yes |
| Test Case 2 | 5 8 2 | no |
| Test Case 3 | 5 12 13 | yes |
| Test Case 4 | 50 130 120 | yes |
| Test Case 5 | 120 130 50 | yes |
| Test Case 6 | 9999 9801 1980 | yes |
| Test Case 7 | 5 8 12 | no |

Sums of Powers of Numbers

Due on 2014-09-16, 23:59 IST

Level: Easy

In this program, you are given an input N, which is a positive integer less than or equal to 40. Write a program to find the sums of fourth powers of the first N numbers.

Sample Input

2

Sample Output

17

Sample Test Cases

| | Input | Output |
|-------------|-------|----------|
| Test Case 1 | 2 | 17 |
| Test Case 2 | 1 | 1 |
| Test Case 3 | 12 | 60710 |
| Test Case 4 | 22 | 1151403 |
| Test Case 5 | 34 | 9768353 |
| Test Case 6 | 40 | 21781332 |

Printing Right Triangles

Due on 2014-09-16, 23:59 IST

Level: Easy

You are given a positive integer N. You have to print N rows as follows. The first row consists of one 0, the second row 2 zeroes, and so on, until the Nth row, which consists of N zeroes.

Sample Test Cases

| | Input | Output |
|-------------|-------|---|
| Test Case 1 | 2 | 0 00 |
| Test Case 2 | 6 | 0 00 000 0000 00000 000000 |
| Test Case 3 | 22 | 0 00 000 0000 00000 000000 |

Triangular Matrix

Due on 2014-09-16, 23:59 IST

Level:Medium

In this assignment, you will be given an $N \times N$ matrix. You have to determine whether the matrix is a triangular matrix.

The diagonal of the matrix M of size $N \times N$ is the set of entries $M(0,0)$, $M(1,1)$, $M(2,2)$, ..., $M(N,N)$.

A matrix is *upper triangular* if every entry *below* the diagonal is 0. For example,

```
1 1 1
0 0 1
0 0 2
```

is an upper triangular matrix. (The diagonal itself, and the entries above and below the diagonals can be zeroes or non-zero integers.)

A matrix is *lower triangular* if every entry *above* the diagonal is 0. For example,

```
2 0 0
3 1 0
4 2 2
```

is a lower triangular matrix.

A matrix is *triangular* if it is either upper triangular or lower triangular.

You may **not** use arrays for this program.

Input

First, you will be given N , which is the size of the matrix.

Then you will be given N rows of integers, where each row consists of N integers separated by spaces.

Output

If the input matrix is triangular, then print `yes`. Otherwise, print `no`.

Sample Test Cases

| | Input | Output |
|-------------|------------------------------|--------|
| Test Case 1 | 2 1 1 0 1 | yes |
| Test Case 2 | 3 1 0 0 0 1 0 1 1 2 | yes |
| Test Case 3 | 3 1 0 1 0 1 0 | no |

| | | |
|-------------|--|-----|
| | 1 1 2 | |
| Test Case 4 | 7 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 | yes |
| Test Case 5 | 7 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 0 0 0 0 0 | yes |
| Test Case 6 | 7 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 0 0 0 0 0 0 0 1 1 0 0 0 0 0 1 1 | no |

Finding the Second Largest Element

Due on 2014-09-16, 23:59 IST

Level: Medium

You are given a sequence of integers as input, terminated by a -1. (That is, the input integers may be positive, negative or 0. A -1 in the input signals the end of the input.)

-1 is not considered as part of the input.

Find the second largest number in the input. You may **not** use arrays.

Sample Test Cases

| | Input | Output |
|-------------|---|--------|
| Test Case 1 | -840 -288 -261 -337 -335 488 -1 | -261 |
| Test Case 2 | -840 -335 -1 | -840 |
| Test Case 3 | 471 -288 -366 488 -335 -420 -840 465 -337 413 -261 458 -1 | 471 |
| Test Case 4 | 593 -588 -93 -288 512 -513 168 -146 -366 -335 180 -49 -266 -840 129 423 458 64 488 32 475 -295 413 193 471 -586 -337 133 -488 394 -420 465 -128 497 -261 55 -615 -40 -888 -507 -1 | 512 |
| Test Case 5 | -146 -288 -266 133 -840 423 -93 64 -335 -513 -366 471 413 488 -420 497 475 -507 129 -615 465 -295 55 -261 -128 593 180 -40 512 458 - 488 193 168 -586 -49 -337 32 -888 -588 -1 | 512 |

Quiz

Due on 2014-09-26, 23:59 IST

The due date for submitting this assignment has passed.

State whether the following expression is valid. If the expression is valid, evaluate the value of the expression; if the expression is not valid state the reason.

(3>5-2)

- ☒ Expression is Valid Expression evaluates to 1
- ☒ Expression is Valid Expression evaluates to 0
- ☒ Expression is Valid Expression evaluates to -2
- ☒ Expression is Valid Expression evaluates to -1
- ☒ Expression is In-Valid Operation is not clearly defined

1 point

State whether the following expressions is valid. If the expression is valid, evaluate the value of the expression; if the expression is not valid state the reason. Assume i=3 , j=2

Tick all that apply

((i>j)&&(i=j))

- ☐ Expression is Valid Expression evaluates to 0
- ☐ Expression is In-Valid Expression gives a compiler-error
- ☐ Expression is Valid Expression evaluates to 1
- ☐ Expression is In-Valid Single = can't be used in the expression

1 point

State whether the following expression is valid. If the expression is valid, evaluate the value of the expression; if the expression is not valid state the reason.

Tick all that apply

(++3*5)

- ☐ Expression is valid Expression evaluates to 16
- ☐ Expression is valid Expression evaluates to 20
- ☐ Expression is valid Expression evaluates to 25
- ☐ Expression is valid Expression evaluates to 17
- ☐ Expression is invalid Increment operator requires a variable to perform its operation

1 point

State whether the following expressions is valid.If the expression is valid, evaluate the value of the expression; if the expression is not valid state the reason. Assume i=3 , j=2

Tick all that apply

(! i || j)

- ☐ Expression is valid Expression evaluates to 1
- ☐ Expression is valid Expression evaluates to 0

- ☐ Expression is in-valid ! is wrongly used
- ☐ Expression is in-valid Expression evaluation is compiler-dependent

1 point

State whether the following expression is valid. If the expression is valid, evaluate the value of the expression; if the expression is not valid state the reason. Assume $i=3$, $j=2$

Tick all that apply

($i=2,-j$)

- ☐ Expression is valid Expression evaluates to 1
- ☐ Expression is valid Expression evaluates to 2
- ☐ Expression is valid Expression evaluates to -2
- ☐ Expression is valid Expression evaluates to 0
- ☐ Expression is in-valid Expression evaluation is compiler dependent
- ☐ Expression is in-valid Assignment operation evaluates to nothing

2 points

This code takes a number num as input, and outputs the sum of the odd numbers in the range 0,1,...,num, including num if it is odd. Please complete the code.

```
int main()
{
    int i = 1;
    int num; /*number of elements */
    int oddsum=0; /* sum of odd numbers */
    scanf("%d",&num);
    while(i<=num)
        { oddsum=oddsum+i;
          i = ____1____
        }
    printf("%d\n",oddsum);
    return 0;
}
```

1 point

Consider the following program:

```
int main()
{
    int low=0,high=0; //Enter the range low and high
    scanf("%d %d", &low, &high);
    int i, digit, n, sum;
    for(i = low; i<= high ;i++)
    {
        n = i;
        sum = n;
        while(sum > 9)
        {
            n = sum;
```

```

sum = 0;
while(n > 0)
{
    digit = n%10;
    n = n/10;
    sum = sum + digit;
}
}
if(sum == 1)
{
    printf("%d is a CS101 quiz number ",i);
}
}
return 0;
}

```

Write down the the output of the code when the input is

10 30

2 points

Question : AlphaNumeric

Complete the following function that returns 1 if the input is alphanumeric else it returns 0 to the calling function

```

int isalphanum(char c)
{
    int result;
    if (c>=   1   && c <= 'z')
        return 1;
    if (c>=   2   && c<= 'Z')
        return 1;
    if (c>=   3   && c<=   4  )
        return   5  ;
    return   6  ;
}

```

Response to Alphanumeric (Question 8) Blank 1

1 point

Response to Alphanumeric (Question 8) Blank 2

1 point

Response to Alphanumeric (Question 8) Blank 3

1 point

Response to Alphanumeric (Question 8) Blank 4

1 point

Response to Alphanumeric (Question 8) Blank 5

1 point

Response to Alphanumeric (Question 8) Blank 6

1 point

Question : Armstrong Number

Below is a program that checks whether a given number is an Armstrong number or not.

An Armstrong number is the one in which the sum of cubes of its digit is equal to the number itself. The program takes a number as input and output whether the given number is an Armstrong number or not.

For example:

(a) 371 is an Armstrong Number as $27+343+1=371$

(b) 153 is an Armstrong Number ($1+125+27=153$)

(c) 42 is not an Armstrong Number ($64+8=72$)

Complete the program by filling in the blanks. Please note that the syntax has to be fully correct including semicolons (the ';' symbol). [There are EIGHT missing components.]

```
int main()
{
    int number, total;
    int finalDigit;
    printf("Enter the number: ");
    scanf("%d",__1__);
    int n = number;
    total = __2__
    while( n __3__ 0)
    {
        finalDigit = __4__
        total = total + __5__;
        n = __6__
    }
    printf("The total is __7__\n",total);
    if(total __8__ number)
        printf("%d is a Armstrong number \n",number);
    else
        printf("%d is not a Armstrong number \n",number);
    return 0;
}
```

Response to Armstrong Number (Question 14) Blank 1

1 point

Response to Armstrong Number (Question 14) Blank 2

1 point

Response to Armstrong Number (Question 14) Blank 3

1 point

Response to Armstrong Number (Question 14) Blank 4

1 point

Response to Armstrong Number (Question 14) Blank 5

1 point

Response to Armstrong Number (Question 14) Blank 6

1 point

Response to Armstrong Number (Question 14) Blank 7

1 point

Response to Armstrong Number (Question 14) Blank 8

Function to return the quotient

Due on 2014-09-28, 23:59 IST

Level: Easy

Write a function called **divide** that takes two **non-negative** integers : a and b and returns the quotient of a divided by b, if b is a factor of a, else it returns -1.

Note: In this assignment the main() function is given to you. The given code for main() cannot be changed by you and divide() is being called from inside that. You only need to write the divide function.

Also note that the #include line is also provided so you do not need to add it while writing the divide() function.

Sample Test Cases

| | Input | Output |
|-------------|--------------------|--------|
| Test Case 1 | 4 2 | 2 |
| Test Case 2 | 2 4 | -1 |
| Test Case 3 | 2 3 | -1 |
| Test Case 4 | 4 2 | 2 |
| Test Case 5 | 4 0 | -1 |
| Test Case 6 | 0 6 | 0 |
| Test Case 7 | 1 2 3 4 1 2 3 4 | 1 |

Choose k objects from n distinct objects

Due on 2014-09-28, 23:59 IST

Level: Easy

Write a C program that calculates the number of ways to choose k objects from n distinct objects. 'k' and 'n' both are integers.

Input Format:

First line contains the value of n, where $0 \leq n \leq 10$

Second line contains the value of k, where $k \geq 0$

Output Format:

One line containing the number of ways to chose the objects

Note: In this question you are not given main() so you have to write the complete program.

Note: In the below given Sample Test Cases, the second test case is incorrect. The course staff is fixing it but the expected answer will be 2 and not 1. If you think your code is correct, try submitting it and you should get 100% score.

Sample Test Cases

| | Input | Output |
|-------------|--------|--------|
| Test Case 1 | 4 2 | 6 |
| Test Case 2 | 2 1 | 2 |

| | | |
|-------------|-------------|-----|
| Test Case 3 | 5 2 | 10 |
| Test Case 4 | 7 0 | 1 |
| Test Case 5 | 4 100000 | 0 |
| Test Case 6 | 10 5 | 252 |
| Test Case 7 | 10 10 | 1 |

Missing Integer Problem

Due on 2014-09-28, 23:59 IST

Level: Medium

You are given a sequence of $n-1$ distinct positive integers, all of which are less than or equal to a integer 'n'. You have to find the integer that is missing from the range $[1, 2, \dots, n]$. Solve the question without using arrays.

Input Format:

One line containing the integer 'n' where $2 \leq n \leq 10,000$

First line is followed by a sequence of 'n-1' distinct positive integers. Note that the sequence may not be in any particular order.

Output Format:

One line containing the missing number

Sample Test Cases

| | Input | Output |
|-------------|--|---------------|
| Test Case 1 | 3 1 2 | 3 |
| Test Case 2 | 4 1 3 4 | 2 |
| Test Case 3 | 4 2 1 4 | 3 |
| Test Case 4 | 5 1 4 5 3 | 2 |
| Test Case 5 | 10 10 9 7 3 2 1 4 5 8 | 6 |
| Test Case | 10000 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 | 542 |

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 |
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| | | | | | | | | | | | | | |
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| 8 | 10 | 12 | 14 | 16 | 18 | 20 | 22 | 24 | 26 | 28 | 30 | 32 | 34 |
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| 1858 | 1860 | 1862 | 1864 | 1866 | 1868 | 1870 | 1872 | 1874 | 1876 | 1878 | 1880 | 1882 | 1884 |
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| 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 |
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| 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 10000 | |
| Test Case 7 | 2 2 | 1 |

LCM of n numbers

Due on 2014-09-28, 23:59 IST

Level: Medium

Write a C program that calculates the least common multiple (LCM) of 'n' numbers.

Input Format:

First line contains the number of numbers that are input 'n', where $n > 1$

Second line contains 'n' positive integers whose LCM is to be calculated

Output Format:

One line containing the LCM of the 'n' numbers

Sample Test Cases

| | Input | Output |
|-------------|---------------|--------|
| Test Case 1 | 4 3 4 7 11 | 924 |
| Test Case 2 | 3 4 6 10 | 60 |
| Test Case 3 | 4 | 30 |

| | | |
|-------------|-----------------------|-----------|
| | 3 2 10 15 | |
| Test Case 4 | 3 1 10 1 | 10 |
| Test Case 5 | 1 4 | 4 |
| Test Case 6 | 4 1031 53 47 139 | 356982719 |
| Test Case 7 | 6 643 4 12 3 101 1 | 779316 |

Finding co-prime numbers

Due on 2014-09-28, 23:59 IST

Level: Difficult

Write a C program that given an integer 'n', prints the number of integers that are less than or equal to 'n' and co-prime to 'n'

Two integers a and b are said to be relatively prime or co-prime if the only positive integer that evenly divides both of them is 1. That is, the only common positive factor of the two numbers is 1. This is equivalent to their greatest common divisor being 1.

Input Format:

One line containing the value of 'n' , where $1 \leq n \leq 10,000$

Output Format:

One line containing the number of integers that are co-prime to n and less than or equal to 'n'

Sample Test Cases

| | Input | Output |
|-------------|-------|--------|
| Test Case 1 | 10 | 4 |
| Test Case 2 | 23 | 22 |
| Test Case 3 | 11 | 10 |
| Test Case 4 | 30 | 8 |
| Test Case 5 | 1 | 1 |
| Test Case 6 | 1331 | 1210 |
| Test Case 7 | 10000 | 4000 |

Lexicographically preceding permutation

Due on 2014-10-19, 23:59 IST

Level: Difficult

Given an integer n and a permutation of numbers $1, 2 \dots, n-1, n$ write a program to print the permutation that lexicographically precedes the given input permutation. If the given permutation is the lexicographically least permutation, then print the input permutation itself.

Input Format:

First line is the value of integer n : $1 \leq n \leq 1,000,000$

Second line is a space separated list of integers $1\ 2 \dots n$ permuted in some random order

Output Format: Output a single line containing a space separated list of integers which is the lexicographically preceding permutation of the input permutation.

Sample Test Cases

| | Input | Output |
|-------------|----------------------------------|----------------------------|
| Test Case 1 | 3 1 3 2 | 1 2 3 |
| Test Case 2 | 4 3 1 2 4 | 2 4 3 1 |
| Test Case 3 | 7 1 2 3 4 5 6 7 | 1 2 3 4 5 6 7 |
| Test Case 4 | 5 5 1 2 4 3 | 5 1 2 3 4 |
| Test Case 5 | 12 3 1 2 4 5 6 7 8 9 10 11 12 | 2 12 11 10 9 8 7 6 5 4 3 1 |

Count occurrences of pattern string

Due on 2014-10-19, 23:59 IST

Level: Medium

Given a source string S and a pattern string P , count the number of times the pattern string P occurs in the source string S .

Note: Overlapping sequences are counted as separate occurrences.

Input Format:

First line is the source string S s.t. $1 \leq |S| \leq 8192$ characters

Second line is the pattern string P s.t. $1 \leq |P| \leq 8192$ characters

Output Format:

Output a single integer containing the number of occurrences of pattern string P in source string S .

Sample Test Cases

| | Input | Output |
|-------------|---------------------|--------|
| Test Case 1 | mississippi issi | 2 |
| Test Case 2 | ouagadougou ou | 3 |

| | | |
|-------------|---------------|---|
| Test Case 3 | banana ana | 2 |
| Test Case 4 | a banana | 0 |
| Test Case 5 | ghhana ha | 1 |

Print Subarray

Due on 2014-10-19, 23:59 IST

Level: Easy

Given an input character array of A and start index S and end index E, write a function that prints the sub array starting from S (including S) and ending at index E (including E). The character array may contain spaces and tabs.

Note: You are given the main function. Just write the subroutine 'void printSubarray(char *a, int start, int end)'.

Input Format:

First line is the input array A s.t. $1 \leq |A| \leq 8192$

Second line is the start index S s.t. $0 \leq S \leq |A|-1$

Third line is the ending index E s.t. $0 \leq E \leq |A|-1$

Output Format:

A single line containing the sub array of A from start index S to end index E.

Sample Test Cases

| | Input | Output |
|-------------|---|--|
| Test Case 1 | It was a nice, sunny day. 1 4 | t wa |
| Test Case 2 | boneywasawarrior 0 12 | boneywasawarr |
| Test Case 3 | Sankore Madrasah, The University of Sankore, or Sankore Masjid is one of three ancient centers of learning located in Timbuktu, Mali, West Africa. The three mosques of Sankore, Djinguereber Mosque and Sidi Yahya compose the famous University of Timbuktu. Madrasah means school/university in Arabic and also in other languages associated with Muslim people. 0 105 | Sankore Madrasah, The University of Sankore, or Sankore Masjid is one of three ancient centers of learning |
| Test Case 4 | The talking drum is an hourglass-shaped drum from West Africa, whose pitch can be regulated to mimic the tone and prosody of human speech. It has two drumheads connected by leather tension cords, which allow the player to modulate the pitch of the drum by squeezing the cords between his arm and body. A skilled player is able to play whole phrases. Similar hourglass-shaped drums are found in Asia, but they are not used to mimic speech, although the idakka is used to mimic | T |

| | | |
|-------------|------------------------|----------|
| | vocal music. 0 0 | |
| Test Case 5 | 01234567 89 0 8 | 01234567 |

Center Align Text

Due on 2014-10-19, 23:59 IST

Level: Easy

Given an input string S, center justify the string by using the character '_' to align the string. There will be neither preceding spaces before the string S nor suffix spaces after the string S. The output should be center-justified in a line of width 64 characters, followed by a newline.

Note:

1. If S has an odd number of characters then the number of preceding '_' should be one more than the number of trailing '_'
2. If S has an even number of characters then the number of preceding '_' should be equal to the number of trailing '_'

Input Format:

First line is the input string S s.t. $1 \leq |S| \leq 64$

Output Format:

Output the center justified string S followed by a newline.

Sample Test Cases

| | Input | Output |
|-------------|--|--|
| Test Case 1 | I love programming | _____I love programming_____ |
| Test Case 2 | Pneumonoultramicroscopicsilicovolcanoniosis | _____Pneumonoultramicroscopicsilicovolcanoconiosis_____ |
| Test Case 3 | 12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234 | 12345678901234567890123456789012345678901234567890123456789012345678901234567890123456789012345678901234 |
| Test Case | 1 | _____1_____ |

| | | |
|-------------------|------------------|-------------------------------|
| se 4 | | |
| Test Case 5 | This is too easy | _____This is too easy_____ |
| Test Case 6 | P=NP ? | _____P=NP ?_____ |
| Test Case 7 | Always | _____Always_____ _____ |

Last ant on rod

Due on 2014-10-19, 23:59 IST

Level: Difficult

There are 'n' ants on a '**n+1**' length rod. The ants are numbered from 1 to n and are initially placed at positions starting from position 1 till position n. They are moving either in left direction (denoted by '-1') or in the right direction (denoted by '1'). Whenever an ant crosses the boundary of the rod it falls off the rod. You are given the initial direction of the ants. Now, whenever two ants collide their direction switches, i.e. the ant going in left direction ('-1') changes it's direction towards right ('1') and the ant going in the right direction ('1') changes it's direction towards left ('-1'). Find last ant to fall off the rod.

Note: In case two ants are falling simultaneously in the end print the index of the lower indexed ant.

Input Format:

First line contains the integer 'n' denoting the total number of ants s.t. $1 \leq n \leq 1,000$
Second line contains 'n' space separated numbers (either '1' or '-1') denoting the initial directions of the ants.

Output Format:

Output a single integer which is the index (lower index in case two ants are falling simultaneously in the end) of the last ant to fall off the table.

Sample Test Cases

| | Input | Output |
|--------------|----------|--------|
| Test Case | 2 1 1 | 1 |

| | | |
|-------------|---|-----|
| 1 | | |
| Test Case 2 | 3 1 -1 -1 | 2 |
| Test Case 3 | 2 -1 -1 | 2 |
| Test Case 4 | 8 1 1 -1 1 1 1 -1 1 | 3 |
| Test Case 5 | 10 1 -1 1 1 -1 1 -1 1 -1 -1 | 5 |
| Test Case 6 | 100 -1 -1 -1 -1 1 -1 -1 1 -1 1 -1 1 1 -1 -1 -1 1 -1 1 1 1 -1 1 1 1 -1 1 -1 1 -1 1 1 1 -1 -1 1 -1 -1 -1 1 -1 1 -1 1 -1 1 1 1 1 1 1 -1 1 1 -1 -1 -1 -1 -1 1 -1 -1 -1 -1 1 1 -1 -1 1 1 -1 1 -1 -1 1 1 -1 -1 1 1 -1 -1 1 -1 -1 1 1 1 1 -1 1 1 -1 -1 -1 -1 1 1 -1 | 52 |
| Test Case 7 | 1000 1 1 1 -1 1 -1 1 -1 1 1 -1 -1 -1 1 -1 -1 1 -1 -1 1 1 -1 -1 1 -1 -1 1 1 1 1 -1 1 1 -1 1 1 -1 1 -1 -1 1 -1 1 1 1 -1 1 -1 1 -1 -1 1 -1 1 -1 -1 1 -1 1 1 1 -1 -1 1 -1 -1 -1 1 1 1 1 -1 1 1 1 -1 -1 1 -1 -1 -1 -1 -1 -1 1 1 1 1 -1 -1 1 1 -1 -1 -1 1 1 1 1 1 -1 1 1 1 1 1 -1 1 1 -1 -1 1 1 -1 -1 -1 -1 -1 -1 -1 1 -1 -1 -1 1 -1 -1 -1 -1 1 -1 1 1 -1 1 1 1 -1 -1 -1 -1 1 -1 -1 1 1 -1 1 1 1 1 -1 -1 1 1 -1 1 -1 -1 1 1 -1 1 1 1 -1 1 -1 -1 -1 1 -1 1 1 1 1 1 -1 -1 -1 -1 1 1 1 -1 1 -1 -1 1 1 -1 1 -1 1 -1 1 -1 1 1 -1 1 1 1 1 -1 -1 -1 1 -1 -1 1 1 -1 -1 1 1 1 1 -1 1 -1 1 1 1 1 1 1 -1 1 -1 -1 1 -1 -1 -1 1 1 1 - 1 -1 1 -1 -1 1 1 -1 1 -1 -1 -1 1 1 1 1 1 -1 1 1 1 1 1 1 1 -1 1 1 -1 -1 -1 -1 1 1 1 -1 1 -1 -1 -1 -1 -1 1 1 -1 -1 1 1 1 -1 -1 -1 -1 1 1 1 1 -1 1 -1 -1 1 -1 1 1 1 -1 -1 -1 1 -1 -1 1 -1 1 1 -1 -1 -1 -1 -1 1 1 1 1 1 -1 -1 1 1 -1 1 -1 -1 1 -1 -1 1 -1 1 1 1 1 1 -1 -1 -1 1 1 1 -1 1 1 -1 1 1 1 1 -1 1 1 -1 -1 1 -1 -1 1 1 1 1 1 -1 -1 1 -1 1 -1 -1 1 -1 -1 -1 1 -1 -1 -1 -1 1 -1 -1 1 1 -1 1 1 -1 1 1 1 -1 1 -1 1 -1 -1 1 1 -1 1 -1 -1 1 1 1 -1 -1 -1 1 1 -1 1 1 -1 -1 -1 1 1 1 1 1 -1 1 1 -1 1 -1 -1 1 1 -1 1 1 1 -1 1 -1 -1 -1 1 1 -1 -1 -1 -1 -1 -1 -1 1 -1 1 -1 1 -1 -1 -1 1 -1 1 -1 1 1 1 1 1 -1 1 1 1 1 1 1 -1 -1 -1 1 1 1 1 -1 -1 -1 -1 1 1 -1 1 -1 -1 -1 1 -1 -1 -1 1 -1 1 -1 1 -1 1 1 -1 1 -1 -1 -1 1 -1 -1 1 1 1 1 1 -1 1 -1 1 1 -1 -1 -1 1 -1 1 -1 1 1 -1 1 1 -1 1 1 1 -1 1 1 -1 -1 -1 -1 -1 1 1 1 1 -1 -1 -1 -1 1 1 -1 -1 1 1 -1 1 -1 -1 -1 1 1 1 1 1 1 -1 1 -1 -1 -1 1 -1 -1 -1 1 -1 | 493 |

Find the compressed string

Due on 2014-10-19, 23:59 IST

Level: Medium

You are given a collection of words, say as in a dictionary. You can represent it in the following compressed form: the first word will be followed by a sequence of a pair of number and a word. The number in the pair is the position till which the previous words' characters are included in the new word and the tail is the remaining trailing word which is the different than the previous word.

Example:

Suppose successive words in our dictionary are:

color
comma
commatose
dot

Then we can compress it in the following way:

color
2 mma (to denote that first two characters are same as that of 'color' and remaining string is 'mma')
5 tose (to denote that the first five characters are same as that of 'comma' and remaining string is 'tose')
0 dot (to denote that zero characters are same as that of 'commatose' and the remaining string is 'dot')

Input Format:

First line contains the integer 'n' denoting the number of words in the dictionary s.t. $1 \leq n \leq 1,000$

Second line would contain the first word.

It will be followed by 'n-1' lines each containing an integer and a trailing string.

Note: The input is designed such that the integer will always be \leq size of previous word formed

Example Input:

4
zebra
3 u
2 nith
1 ggurat

Output Format:

Output a single string that is the last resulting word of the given dictionary

Example Output:

zggurat

Explanation:

The dictionary actually is:

zebra

zebu (3 first characters are common with zebra)

zenith (2 first characters are common with zebu)

zggurat (1 first character is common with zenith)

Sample Test Cases

| | Input | Output |
|-------------|---|--------------------|
| Test Case 1 | 4 zebra 3 u 2 nith 1 iggurat | ziggurat |
| Test Case 2 | 3 cool 4 er 2 mmon-man | common-man |
| Test Case 3 | 1 batman | batman |
| Test Case 4 | 10 apple 2 titude 0 bail 3 t 2 hool 1 hoopla 4 newmist 5 oliberstein 2 diem 6 mon | bhdiemmon |
| Test Case 5 | 10 moonwalk 7 vfsetzquhskb 6 tpcu 4 c 0 cbeiusyxj 7 psrtzgky 0 efzipsko 3 wy 1 l 1 fqnhgfi | efqnhgfi |
| Test Case 6 | 100 numismatic 4 qenarvwvdoxwe 1 orlx 0 gtwnuwpuk 5 afncdsjlvts 5 yvnazxhxwm 8 yyv 0 vvbgiwvzxk 2 zqdjmesk 8 sswst 2 uptpvoqgyxk 3 oykyiyejf 9 zgazbxgiow 9 tgskepeomy 0 kh 1 fffnwyfxwkl 6 qyyyi 5 bna | wvmhjoaffvfwvpvdjn |

0 roabn
2 atxaasdvn
7 udxmrx
2 mj
1 sujhmdvttdmmk
0 hxpunh
5 fyuaKn
6 qdzcoygommz
4 atsrwrqreqqrd
3 cvq
1 yitw
3 milrqnvt
0 smgxam
0 nbzewrl
0 sn
2 jvnumiltnksx
8 yroag
4 qgzdpulkbabj
1 znjxhkon
4 asxkl
2 uosqlpwvmjdkg
3 p
0 qfeksdde
4 jxrh
0 pvjscrxlcp
8 bhvt
1 hkxkjzynpsr
3 bejsrdmgoqh
8 fgcVz
5 mgoiaq
3 zqdc
4 kccxcwkwncIju
8 zqWds
2 pdzrugtzmdnpo
8 lpxveuprlo
8 xhgecpybcwhhm
2 z
0 iydegboizv
5 bmr
0 vwvrdnbx
0 ihfbpzuhoeab
7 obsdzfakstbwb
8 xeqchqkpvqghrv
3 hc
0 cvfbzhdrxswh
3 rnXHonihtbwur
5 kggsjwengcpj
8 mqicx
4 ivcbk
0 iqlxz
4 not
1 oabgsoeeo
9 cbtoaJD
2 brjyglonjkludw
1 c
1 bqcis
0 pllddbnp
7 tazz
4 pfhwfq
3 tkenatmlnbwkg
7 hLhthxpqx
2 fvv
3 mwdomqd
2 zdy
0 wfdyxvuxj
7 hlobzyokl
6 loyma

| | | |
|-------------|--|---------------|
| | 3 jv 2 c 1 t 1 o 1 vmypta 4 ncxqk 3 hcfvzevwgvacxn 7 enzvegnlnofuju 7 xecqhwgw 4 sggymtupoffiky 4 undcjrjsmcsqb 7 sjihyjv 4 joadarnwee 7 fucsmwtwvjkwy 8 fvfwpvdjn | |
| Test Case 7 | 200 kleptomaniac 6 dcad 3 k 0 oapciiocvrj 9 xlft 0 vecrreglymwk 8 shkownf 4 nfpkpohnjexx 9 jzzpllqznzwwai 9 irq 2 plympr 4 vrpgiewhgyyul 9 padg 0 wmhihff 5 udhmk 5 zrwthvttbbzgf 9 kv 1 yewqcmvksxkao 1 utcxdjzwnhoek 0 uwwsuyoovdvqv 3 dooktiakhvg 3 cjltljcfq 2 zyivo 1 xzeybxoung 3 hterpypz 6 xdocdlrmx 0 csoenhqauwyx 3 vlatymegwqxzh 9 wnekazvf 2 vjlrjuyhgn 9 orz 0 gdipe 5 oibwt 4 nsenupifo 0 czqffvdicpou 3 ugqzw 5 gvqrfdv 4 oivdcrbo 6 fmjwavomvwc 6 ebqib 1 zjmt 2 lfhy 4 kt 2 wjnhdc 6 oq 0 cwctkwxrym 4 hytsozrgjliz 0 nvbmffvxgudeyz 9 iufqq 1 qq | mhwkqlsdvwdhj |

0 oaetsdrjgubw
1 uivxqpxhwyfl
0 taneb
4 npfdtuswilim
5 pjg
2 rptxcgkbrxj
7 pn
1 figbmSQLj
5 fzKxvdjv
8 dmirtamjccgnkd
4 ms
0 xnxXlwgdhfwla
5 rhgcl
4 esirgn
2 fej
0 rqrybkfs
1 lxt
3 wq
2 krqpVbqDqmhma
5 gfokk
5 pfcktyp
4 ztxuimsmL
2 wkl
3 xcsxjepl
7 iueofppwdlsbh
9 lcgh
0 twkfmo
6 qrmder
1 qlkobgcxfr
1 alhldkeabnqm
6 ts
1 zes
3 enwhvzkDthk
0 voaxazqmlsnwd
7 lregeftkrldq
5 gvlT
1 hrogvrlv
5 uv
1 qryyCsdban
8 jkoqbKxkorgz
7 wbjtpjpctlsLqb
5 kzzgbfoap
6 mt
1 vfdvnipispis
0 rmScpdsypahjs
4 xivmhdt
1 wvaonuzcq
3 vmxpwqinygo
3 qpndyv
3 qgdoszdoagcnqh
5 vgd
2 lqqpkwsaqsic
0 tesdh
5 gwwjlmun
6 dsmrpe
4 rakundoyxgtyx
9 gxjufmownjpjpi
1 lkuxajch
4 bugzdzvaakvnol
9 heacujg
7 faoemjzaaut
8 kgcjafdng
6 ihfiu
3 zhxtwccibvm
3 wsfyxfwfuum
4 sxetw
4 pqueutpxzfldlm

7 uztaq
3 ip
2 w
0 makxrplzme
0 yjxfvzseeoydu
2 wop
3 qdubdimxoaff
4 bgj
0 hc
2 qcywauvnidjff
8 zqnomdsmwzt
2 xenykjkpsheuak
1 eavwlky
7 ukxlmcbcivbnpj
0 owtadxydfo
6 bbb
1 rrjqj
4 rtamlt
1 sqcalqra
8 tdpvmpfen
5 ovxkgj
6 cbjhjw
3 sdzt
3 sgw
0 s
0 ov
0 rnqaqbn
1 bkzfsvpqv
2 x
0 i
1 nbgeo
4 rpzkbbquisyt
2 ur
0 lbpaih
2 mpofmbcspr
6 vcvozqfrvm
5 juqthvx
7 ytumqml
6 sw
2 pozkq
3 lgscln
4 va
1 iccbamgjqzzi
5 thjystpxqocr
0 lsflooyw
5 xwgwczb
2 ucir
0 sbuve
5 rmd
1 sesurmpuaha
3 ywatrtccmgjw
9 hifjstm
0 nmdgjeu
3 z
0 uehvugs
1 bztuvwggbyotm
4 iwswn
5 hjrswaiddhz
0 jbkoevtjhhdzy
3 mqdjek
4 hkbbywc
4 hkio
3 qhobzwp
5 bfcfvghm
8 wimxgfwk
1 vavcirvdf
2 svtsy

| | |
|---|---------------|
| 0 | mgjzykhnedvnx |
| 2 | lee |
| 2 | okxefdhxtgvd |
| 3 | nwuinyioa |
| 6 | bdpywodiegtwg |
| 1 | ozxlxhsm |
| 7 | vefckzsau |
| 3 | ulpivhfnfxc |
| 7 | qauluczrmj |
| 1 | twelwqi |
| 6 | gqcrkmgjafasx |
| 3 | zeoothu |
| 1 | htmbjscixj |
| 3 | uccikwto |
| 6 | oregyje |
| 2 | wkqlsdvwdhj |

Quiz on Arrays and Pointers

Due on 2014-10-19, 23:59 IST

The due date for submitting this assignment has passed.

Due on October 17, 2014. 11:59 pm IST

What is the output of the following program?

```
#include <stdio.h>
```

```
void foo(int a[])
```

```
{
```

```
    a[0]=10;
```

```
    printf("%d",a[0]);
```

```
    return ;
```

```
}
```

```
int main()
```

```
{
```

```
    int a[]={1,2,3};
```

```
    foo(a);
```

```
    printf("%d",a[0]);
```

```
    return 0;
```

```
}
```

☐ 11

☐ 101

☐ 1010

☐ 110

1 point

What is the output of the following program?

```
#include<stdio.h>

int main()
{
    int size, i;
    size=5;
    int arr[size]={1,2,3,4,5};
    for(i=1; i<=size;i++)
    {
        printf("%d", arr[i]);
    }
    return 0;
}
```

- ☐ 12345
- ☐ 2345
- ☐ 23456
- ☐ None of These

1 point

In C, if you pass an array as an argument to a function, what actually gets passed?

- ☐ Value of elements in array
- ☐ First element of the array
- ☐ Base address of the array
- ☐ Address of the last element of array

1 point

What will be output if you will execute following c code?

```
#include<stdio.h>

void main(){
    char arr[16]="The African Queen";
    printf("%s",arr);
}
```

- ☐ The African Queen
- ☐ The African Quee
- ☐ he African Queen
- ☐ Error

1 point

What is the valid statement that you can make about the output of the following code?

```
#include<stdio.h>
```

```
void fun(int * a)
{
    int ** x=&a;
    printf("%u\n",x);
    return ;
}
```

```
int main(){
    int a[5]={1,2,3,4,5};
    int * b = a;
    int ** y=&b;
    printf("%u\n",y);
    fun(b);
    return 0;
}
```

- ☐ Both the printed values are necessarily the same
- ☐ Both the printed values are necessarily different
- ☐ Both the printed values may be same
- ☐ None of these

1 point

What will be output if you will execute following C code?

```
#include<stdio.h>
```

```
void main(){
    char arr[20]="MysticRiver";
    printf("%d",sizeof(arr));
}
```

- ☐ 11
- ☐ 20
- ☐ 44
- ☐ 80

1 point

What is the output of the following code?

```
#include<stdio.h>
```

```
int main()
```

```

{
    int a[5] = {5, 1, 15, 20, 25};
    int i, j, m;
    i = ++a[1];
    j = a[1]++;
    m = a[i++];
    printf("%d, %d, %d", i, j, m);
    return 0;
}

```

- ☒ 2 2 15
- ☒ 3 2 20
- ☒ 3 1 20
- ☒ 3 2 15

1 point

Which of the following are correct ways to initialize an array? (There may be multiple answers.)

- ☐ int num[]={1,2,3,4};
- ☐ int num[]={1,2,3,4};
- ☐ int num[4]={1,2,3,4};
- ☐ int num()={1,2,3,4};

1 point

What will be the output of the following program?

```

#include<stdio.h>

int main(){
    int a = 330;
    char *p;
    p =( char *)&a;
    printf("%d ",*p);
    return 0;
}

```

- ☒ 330
- ☒ 74
- ☒ 54
- ☒ 331

1 point

Collatz function

Due on 2014-11-03, 23:59 IST

Difficulty: Easy

The Collatz function is defined for a positive integer n as follows.

$$f(n) = \begin{cases} 3n+1 & \text{if } n \text{ is odd} \\ n/2 & \text{if } n \text{ is even} \end{cases}$$

We consider the repeated application of the Collatz function starting with a given integer n , as follows:

$f(n), f(f(n)), f(f(f(n))), \dots$

It is conjectured that no matter which positive integer n you start from, this sequence eventually will have 1 in it. It has been verified to hold for numbers up to 5×2^{60} [Wikipedia: Collatz Conjecture].

e.g. If $n=7$, the sequence is

1. $f(7) = 22$
2. $f(f(7)) = f(22) = 11$
3. $f(11) = 34$
4. $f(34) = 17$
5. $f(17) = 52$
6. $f(52) = 26$
7. $f(26) = 13$
8. $f(13) = 40$
9. $f(40) = 20$
10. $f(20) = 10$
11. $f(10) = 5$
12. $f(5) = 16$
13. $f(16) = 8$
14. $f(8) = 4$
15. $f(4) = 2$
16. $f(2) = 1$

Thus if you start from $n=7$, you need to apply f 16 times in order to first get 1.

In this question, you will be given a positive number $\leq 32,000$. You have to output how many times f has to be applied repeatedly in order to first reach 1.

Sample Test Cases

| | Input | Output |
|-------------|-------|--------|
| Test Case 1 | 1 | 0 |
| Test Case 2 | 8 | 3 |
| Test Case 3 | 7 | 16 |
| Test Case 4 | 1000 | 111 |
| Test Case 5 | 1001 | 142 |
| Test Case 6 | 2463 | 208 |
| Test Case 7 | 100 | 25 |
| Test Case 8 | 101 | 25 |

Eggs and Building

Due on 2014-11-03, 23:59 IST

Level: Difficult

You are given 'k' eggs and a 'n' storey building. The eggs MIGHT break if thrown down from a specific height (Note: It is NOT necessary that the eggs have to break; they might not even break from the topmost floor). What is the minimum number of steps in which you can find (using 'k' eggs) the minimum height of the floor in the building from which the eggs will start breaking ?

Note: You have to output the minimum number of steps required; NOT the floor of the building from which eggs will break;

Input Format:

First line of the input is an integer 'q':

$1 \leq q \leq 1,000$, which is the number of queries.

Second line of the input has two space separated integers: the height of the building 'n' and the number of eggs which you can use 'k':

$1 \leq n \leq 1,000$

$1 \leq k \leq 10$

Output Format:

For each q output a single line denoting the minimum number of trials required to find the height from which the eggs will start breaking.

Example:

For $n = 151$ and $k = 1$ the minimum number of steps in which we can find the height from which eggs can break(considering the worst case) is 151. This is because since we have only 1 egg we have no choice but to start from the first floor and throw the egg from each floor and check whether it breaks or not. In worst case this might require 151 steps.

For $n = 100$ and $k = 2$ the minimum number of steps in which we can find the height from which eggs can break(considering again the worst case) is 14. This is because suppose we throw the FIRST egg from 14th floor and it breaks then we will have to try each of the remaining 13 floors using the remaining egg. So in this case number of trials required is 14. Suppose the first egg doesn't break then we can drop it from 27th floor ($13 + 14$). We have chosen 27th floor because suppose if the first egg breaks from 27th floor then we will have to test floors from 15-26 ($=12$). So, the total number of trials required in this case is: $12 + 1$ (from 14th floor) + 1 (from 27th floor) = 14 trials. Suppose the first egg doesn't break even now, drop it from 39($12 + 13 + 14$) floor for same reason.

Sample Test Cases

| | Input | Output |
|--|-------|--------|
|--|-------|--------|

| | | |
|-------------|---|--|
| Test Case 1 | 4 10 1 10 2 100 2 104 3 | 10 4 14 9 |
| Test Case 2 | 3 923 8 23 9 101 2 | 10 5 14 |
| Test Case 3 | 5 42 8 35 1 70 5 79 9 63 5 | 6 35 7 7 7 |
| Test Case 4 | 10 42 8 335 1 170 5 479 9 963 5 706 6 282 8 962 2 996 3 828 7 | 6 335 8 9 11 10 9 44 19 10 |
| Test Case 5 | 20 42 8 335 1 170 5 479 9 963 5 706 6 282 8 962 2 996 3 828 7 392 5 903 4 293 3 422 7 719 6 448 7 772 9 870 3 668 10 36 5 | 6 335 8 9 11 10 9 44 19 10 10 13 12 9 10 9 10 18 10 6 |
| Test Case 6 | 100 42 8 335 1 170 5 479 9 963 5 706 6 282 8 962 2 996 3 828 7 392 5 903 4 293 3 422 7 719 6 448 7 | 6 335 8 9 11 10 9 44 19 10 10 13 12 9 10 9 10 |

772 9
870 3
668 10
36 5
704 2
323 4
674 5
142 2
254 9
548 5
663 8
38 10
724 2
530 9
317 6
191 3
289 7
41 3
265 9
447 6
891 10
371 1
7 2
394 9
630 4
85 5
757 1
967 7
932 9
945 10
627 4
538 9
119 3
930 2
834 6
640 9
705 1
978 7
674 7
22 6
925 3
271 10
778 4
98 3
987 1
162 7
356 8
656 5
32 3
351 1
942 5
967 1
108 2
8 8
458 8
754 4
946 10
210 9
222 9
423 7
507 1
414 9
901 2
763 6
411 10
625 8
549 4

18
10
6
38
10
11
17
8
10
10
6
38
10
9
11
9
6
9
9
10
371
4
9
12
7
757
10
10
10
12
10
9
43
10
10
705
11
10
5
18
9
12
9
987
8
9
11
6
351
11
967
15
4
9
12
10
8
8
9
507
9
42
10
9
10
11
35

| | | |
|--|--------|-----|
| | 596 2 | 603 |
| | 603 1 | 9 |
| | 292 7 | 375 |
| | 375 1 | 35 |
| | 597 2 | 9 |
| | 349 10 | 11 |
| | 669 5 | 9 |
| | 282 5 | 6 |
| | 54 10 | 9 |
| | 419 9 | 10 |
| | 901 9 | 8 |
| | 128 8 | 12 |
| | 729 4 | 12 |
| | 649 4 | 40 |
| | 808 2 | 9 |
| | 311 8 | 11 |
| | 814 5 | |

MinInsertPalindrome

Due on 2014-11-03, 23:59 IST
MinInsert-Palindrome Problem

Difficulty : Medium

You are given a string of characters, or numbers. Find the minimum number of characters to be inserted into the string in order to obtain a palindrome. A palindrome is a word, phrase, number, or other sequence of symbols or elements that reads the same forward or reversed.

For example, the string abcbd can be transformed into a palindrome ("dabcbad" or "adbcbda"). However, inserting fewer than 2 characters will not produce a palindrome.

Input Format:

First line contains an integer 'n' specifying the length of the string, where $3 \leq n \leq 20$
 Second line contains a string of length n.

Note: Upper-case and lower-case characters are considered as different. Elements of the string are either English alphabets or numerals.

Output Format

One line containing the minimum number of insertions required to make the string a palindrome

Sample Test Cases

| | Input | Output |
|-------------|--------------|--------|
| Test Case 1 | 5 nitin | 0 |
| Test Case 2 | 7 aabbaab | 1 |

| | | |
|-------------|----------------------------|----|
| Test Case 3 | 20 WbHRKhSxoS18CnGxola3 | 17 |
| Test Case 4 | 20 eeeeeeeeeeeeeeeeeeee | 0 |
| Test Case 5 | 20 0ziG30WBD79ow1E0fu1X | 17 |
| Test Case 6 | 20 OGJ2gg5J5VXLRc4fye7g | 15 |
| Test Case 7 | 20 Yka081R3gN005XK00xN2 | 15 |

Coin Counting

Due on 2014-11-03, 23:59 IST

Curious Coin-Counting Problem

Difficulty : Medium

Given an amount A, we want you to compute the number of ways in which you can gather A rupees if you have an infinite supply of each of $C = \{1, 3, 5\}$ valued rupee coins.

Input:

First line contains T, the number of test-cases. This is followed by T lines, where each line consists of the amount A.

Output:

For each test case, print the number of ways in which A can be formed using an infinite supply of 1, 3 and 5 rupee coins.

Sample Input:

```
2
5
10
```

Sample Output:

```
3
7
```

Constraints

$T < 100$
 $A < 101$

Explanation (for first test case):

$A = 5$

Ways this amount can be achieved: $\{1,1,1,1,1\}$, $\{1,1,3\}$, $\{5\}$

Hence, the answer is 3.

Sample Test Cases

| | Input | Output |
|-------------|--|---|
| Test Case 1 | 2 5 10 | 3 7 |
| Test Case 2 | 100 84 87 78 16 94 36 87 93 50 22 63 28 91 60 64 27 41 27 73 37 12 69 68 30 83 31 63 24 68 36 30 3 23 59 70 68 94 57 12 43 30 74 22 20 85 38 99 25 16 71 14 27 92 81 57 74 63 71 97 82 | 261 279 227 14 323 55 279 317 99 23 152 35 304 139 156 33 69 33 200 57 9 180 175 40 255 42 152 27 175 55 40 2 25 134 185 175 323 126 9 75 40 205 23 20 267 60 357 29 14 190 11 33 310 244 126 205 152 190 343 249 4 |

| | | |
|-------------|---|---|
| | 6 26 85 28 37 6 47 30 14 58 25 96 83 46 15 68 35 65 44 51 88 9 77 79 89 85 4 52 55 100 33 61 77 69 40 13 27 87 95 40 | 31 267 35 57 4 88 40 11 130 29 337 255 85 13 175 52 161 78 103 285 6 221 232 291 267 2 106 118 364 47 143 221 180 66 10 33 279 330 66 |
| Test Case 3 | 100 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 | 1 1 1 2 2 3 4 4 5 6 7 8 9 10 11 13 14 15 17 18 20 22 23 25 27 29 |

| | | |
|--|----|-----|
| | 25 | 31 |
| | 26 | 33 |
| | 27 | 35 |
| | 28 | 37 |
| | 29 | 40 |
| | 30 | 42 |
| | 31 | 44 |
| | 32 | 47 |
| | 33 | 49 |
| | 34 | 52 |
| | 35 | 55 |
| | 36 | 57 |
| | 37 | 60 |
| | 38 | 63 |
| | 39 | 66 |
| | 40 | 69 |
| | 41 | 72 |
| | 42 | 75 |
| | 43 | 78 |
| | 44 | 82 |
| | 45 | 85 |
| | 46 | 88 |
| | 47 | 92 |
| | 48 | 95 |
| | 49 | 99 |
| | 50 | 103 |
| | 51 | 106 |
| | 52 | 110 |
| | 53 | 114 |
| | 54 | 118 |
| | 55 | 122 |
| | 56 | 126 |
| | 57 | 130 |
| | 58 | 134 |
| | 59 | 139 |
| | 60 | 143 |
| | 61 | 147 |
| | 62 | 152 |
| | 63 | 156 |
| | 64 | 161 |
| | 65 | 166 |
| | 66 | 170 |
| | 67 | 175 |
| | 68 | 180 |
| | 69 | 185 |
| | 70 | 190 |
| | 71 | 195 |
| | 72 | 200 |
| | 73 | 205 |
| | 74 | 211 |
| | 75 | 216 |
| | 76 | 221 |
| | 77 | 227 |
| | 78 | 232 |
| | 79 | 238 |
| | 80 | 244 |
| | 81 | 249 |
| | 82 | 255 |
| | 83 | 261 |
| | 84 | 267 |
| | 85 | 273 |
| | 86 | 279 |
| | 87 | 285 |
| | 88 | 291 |
| | 89 | 298 |
| | 90 | 304 |
| | 91 | 310 |

| | | |
|-------------|--|---|
| | 92 93 94 95 96 97 98 99 | 317 323 330 337 343 350 357 |
| Test Case 4 | 1 0 | 1 |

PA5_Student_Database

Due on 2014-11-17, 23:59 IST

Create a database of students using structures, where in each entry of the database will have the following fields:

1. a name, which is a string with at most 128 characters
2. their marks in physics which is **an int** between 0 and 100
3. their marks in chemistry which is **an int** number between 0 and 100
4. their marks in mathematics which is **an int** number between 0 and 100

You have to output a list of students in the following order.

1. if a student 'A' has lower marks in physics than a student 'B', then A's data is listed before B.
2. If A and B have the same physics marks and A has lower chemistry marks than B, then A is listed before B.
3. If A and B have the same marks in physics and chemistry, and A has lower marks in mathematics than B, then A is listed before B.
4. If all marks are equal and A's name precedes B's name in the dictionary order, then A is listed before B.

Input Format :

First line contains the number of students n , where $1 \leq n \leq 100$.

In following n lines each line contains(space separated) a name and their respective marks in physics, chemistry, maths, where $0 \leq \text{marks} \leq 100$.

Output Format :

Sorted database of n lines.

Sample Test Cases

| | Input | Output | | | |
|-------------|--|--|--|--|--|
| Test Case 1 | 2 kanu 84 74 88 parvez 69 78 85 | parvez 69 78 85 kanu 84 74 88 | | | |
| Test Case 2 | 4 apurva 72 78 84 mayank 83 76 86 abha 72 79 75 jyoti 83 76 92 | apurva 72 78 84 abha 72 79 75 mayank 83 76 86 jyoti 83 76 92 | | | |
| Test Case 3 | 1 ankita 72 76 85 | ankita 72 76 85 | | | |
| Test Case 4 | 7 Abhimanyu 100 94 90 Akshay 90 91 83 Akshay 100 88 88 Aman 70 94 88 Amendra 80 95 85 Amit 70 82 89 Amit 80 82 70 | Amit 70 82 89 Aman 70 94 88 Amit 80 82 70 Amendra 80 95 85 Akshay 90 91 83 Akshay 100 88 88 Abhimanyu 100 94 90 | | | |
| Test Case 5 | 50 Ankit 90 89 86 Ankush 80 92 92 Anshu 90 98 96 Arihant 90 92 95 Arpit 90 93 92 Ashok 70 77 63 Ashwini 80 89 89 Ayush 80 86 80 Bhupendra 70 91 88 Ch 80 85 88 Chandra 80 97 89 Devendra 80 89 86 Dheeraj 80 93 89 Dhruv 90 91 92 Dhruv 90 93 88 Divyanshu 90 97 94 Gaganpreet 100 91 94 Ganesh 90 96 97 Gidijala 80 90 96 Guddu 80 65 69 Harsha 80 87 94 Harshad 90 94 94 Harshit 90 89 92 Harshvardhan 80 95 95 Jitendra 80 86 92 Karan 100 95 91 Kaustubh 100 92 91 Lohit 80 93 89 Manav 90 95 92 Massand 80 89 82 Mohd 80 91 88 Mohit 90 94 89 Mohit 90 94 94 Nikunj 90 93 95 Nittala 90 93 96 Pankaj 90 95 91 Parth 90 95 90 Pranjal 80 92 96 Prashant 90 94 92 Prashant 80 93 91 Prashant 70 92 90 Praveen 90 91 87 Rabi 80 96 97 | Ashok 70 77 63 Bhupendra 70 91 88 Prashant 70 92 90 Guddu 80 65 69 Ch 80 85 88 Ayush 80 86 80 Jitendra 80 86 92 Harsha 80 87 94 Massand 80 89 82 Devendra 80 89 86 Ashwini 80 89 89 Rohun 80 89 95 Gidijala 80 90 96 Mohd 80 91 88 Ankush 80 92 92 Pranjal 80 92 96 Dheeraj 80 93 89 Lohit 80 93 89 Prashant 80 93 91 Harshvardhan 80 95 95 Rabi 80 96 97 Chandra 80 97 89 Rishika 80 97 93 Ankit 90 89 86 Harshit 90 89 92 Praveen 90 91 87 Dhruv 90 91 92 Arihant 90 92 95 Dhruv 90 93 88 Arpit 90 93 92 Nikunj 90 93 95 Nittala 90 93 96 Mohit 90 94 89 Prashant 90 94 94 Harshad 90 94 94 Mohit 90 94 94 Parth 90 95 90 Pankaj 90 95 91 Manav 90 95 92 Rohan 90 95 94 Rohit 90 96 92 Ganesh 90 96 97 Divyanshu 90 97 94 Samyak 90 97 95 | | | |

| | | |
|-------------|---|---|
| | Rishika 80 97 93 Rohan 90 95 94 Rohit 90 96 92 Rohun 80 89 95 Sakaar 100 94 93 Samyak 90 97 95 Shaik 90 97 96 | Shaik 90 97 96 Anshu 90 98 96 Gaganpreet 100 91 94 Kaustubh 100 92 91 Sakaar 100 94 93 Karan 100 95 91 |
| Test Case 6 | 4 Kamna 80 87 94 Jaimita 80 87 94 Harsha 80 87 94 Harshad 80 87 94 | Kamna 80 87 94 Jaimita 80 87 94 Harsha 80 87 94 Harshad 80 87 94 |

PA5_Matrix_Exponentiation

Due on 2014-11-17, 23:59 IST

Level: Difficult

In this problem, you will be given a square matrix M and a positive integer power N. You will have to compute M raised to the power N. (that is, M multiplied with itself N times.)

Input

First line of input is T (number of test-cases) First line of each test-case contains two integer M , N where M is size of square array that we have to exponent and N is the power to which we have to exponent

Next M lines describe the input matrix. Each line contains exactly M elements corresponding to each array

Limits

$1 \leq T \leq 10$

$1 \leq M \leq 50$

$1 \leq N \leq 100000$

Output

Output M line corresponding to each row of resultant matrix Each line must have M integers where jth element of ith line is jth element of resultant matrix taken modulo with $1000000007 (10^9+7)$

Sample Test Cases

| | Input | Output |
|-------------|--|--|
| Test Case 1 | 3 2 3 1 0 1 1 3 3 1 0 4 1 2 2 0 4 4 3 3 1 3 2 | 1 0 3 1 17 112 116 15 88 100 28 144 160 41 101 102 32 89 108 54 132 132 |

| | | |
|-------------|---|--|
| | 0 1 4 2 4 2 | |
| Test Case 2 | 4 2 3 2 0 1 4 2 3 3 1 0 0 3 3 0 3 1 4 3 2 2 3 2 2 2 2 3 3 2 | 8 0 28 64 27 9 0 0 64 102 54 136 171 98 108 147 82 13 12 12 13 |
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| 855078284 | 46159588 | |

PA5_MazeProblem

Due on 2014-11-17, 23:59 IST

Maze Problem

You are provided a matrix of size N*N with source position at (0,0) and destination at (N-1,N-1) in a 2D array. Some of the positions in the array are marked as 0 which are blocked cells, rest being marked 1.

A path is a connected sequence of elements from (0,0) to (N-1,N-1) which consists of 1. A sequence of 1s in the 2D array is connected if every 1 in the sequence is adjacent (the above or left neighbour) to the next 1 in the sequence.

For example, in the following matrix,

```

1 1 0
0 1 1
1 0 1

```

the 1s marked in blue is a connected path from (0,0) to (2,2)

Note that cells at (0,0) and (N-1,N-1) are always 1. You can either make movement towards right or down, i.e., from position (x,y), you can go to either the position (x,y+1) or (x+1,y).

Input

First line consists of the size of the input array N (<=50), following that would be the state of NxN maze which would consist of 0s and 1s.

Output

You have to print "POSSIBLE" if there exists a path between the source and the destination otherwise print "NOT POSSIBLE".

Sample Test Cases

| | Input | Output |
|-------------|---|--------------|
| Test Case 1 | 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 | POSSIBLE |
| Test Case 2 | 3 1 0 0 0 0 0 0 0 1 | NOT POSSIBLE |
| Test Case 3 | 10 1 0 1 1 0 1 0 0 1 0 1 1 1 1 0 1 0 0 1 0 1 0 1 1 1 1 1 0 1 1 1 0 0 0 0 1 1 1 0 0 0 0 0 1 1 0 1 1 1 0 0 0 0 1 1 1 1 0 0 1 0 0 1 0 0 0 1 1 0 1 1 0 1 0 1 0 1 0 0 0 1 0 1 0 1 1 1 1 1 0 1 1 1 0 0 1 1 0 1 1 | POSSIBLE |
| Test Case 4 | 10 1 1 1 1 1 1 0 1 0 0 0 0 0 1 0 0 0 1 0 0 0 1 0 1 0 0 1 1 1 1 0 1 1 1 1 1 1 1 1 1 1 0 1 0 0 1 1 0 1 1 0 0 1 0 1 1 0 0 0 1 1 1 1 1 0 1 1 1 0 0 1 0 0 0 0 0 1 0 1 0 0 1 1 0 0 0 0 1 1 0 0 0 0 0 0 1 1 0 1 1 | NOT POSSIBLE |
| Test Case 5 | 30 1 0 0 1 0 1 0 1 1 0 1 1 1 0 0 1 1 0 1 0 1 0 0 0 1 1 0 1 0 1 0 0 1 1 1 0 0 0 0 0 0 1 0 1 0 1 1 0 0 0 1 0 1 0 0 0 1 0 0 0 1 0 0 0 1 0 1 1 0 1 0 1 0 1 0 0 1 0 0 1 0 1 1 1 0 0 0 1 1 0 0 0 1 1 0 1 0 1 1 0 1 1 1 1 0 0 1 1 0 0 0 1 1 0 1 0 0 1 0 0 1 0 0 1 1 0 1 0 0 1 0 0 1 0 1 0 1 1 0 1 0 1 1 0 1 0 1 1 0 0 1 0 1 0 1 0 1 0 1 0 0 0 0 1 1 1 1 1 0 1 1 0 0 0 1 1 1 1 0 1 0 0 1 1 0 1 1 0 0 1 1 0 0 1 0 0 1 0 1 0 1 0 1 1 1 0 1 0 1 0 0 0 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 0 1 1 0 1 1 1 1 1 0 1 1 0 1 1 0 1 0 0 0 1 0 0 1 0 0 1 0 0 1 1 1 1 0 0 1 0 1 0 1 1 1 0 0 1 0 0 1 0 1 0 0 0 1 0 0 1 0 0 1 0 1 1 1 0 0 0 0 0 0 1 0 1 0 1 0 0 0 1 0 1 0 0 0 1 0 0 0 1 0 0 1 0 0 1 0 1 0 1 0 1 0 1 0 0 0 0 0 1 0 1 1 1 0 0 0 1 0 0 1 1 0 1 0 1 0 1 1 0 1 1 1 1 0 0 0 1 0 0 0 1 1 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 0 1 0 1 0 0 1 0 1 0 1 1 0 1 0 1 0 1 1 0 0 1 1 1 1 0 1 0 1 0 0 0 1 1 1 1 1 0 1 1 0 0 0 1 1 1 1 0 1 0 0 1 1 0 1 1 0 0 1 1 0 0 1 0 0 1 0 1 0 1 0 1 1 1 0 1 0 1 0 0 0 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 0 1 1 1 1 1 1 1 0 1 1 0 1 1 1 0 1 0 0 0 1 1 0 0 1 0 0 0 0 1 0 0 1 1 1 1 0 0 1 0 1 0 1 1 0 1 1 1 0 0 1 0 0 1 0 1 0 0 0 1 1 0 1 0 1 0 0 1 1 1 0 0 0 0 0 0 1 0 1 0 1 1 0 0 1 1 0 0 0 0 0 1 0 1 0 0 0 1 0 0 0 1 0 0 0 1 1 1 1 0 1 0 1 0 1 0 0 0 0 0 1 0 1 1 1 0 0 0 1 1 0 0 0 1 1 0 1 0 1 1 0 1 0 0 1 0 0 1 1 1 1 0 0 0 1 0 0 0 1 1 0 0 0 1 0 0 1 0 0 1 1 0 1 1 0 0 1 0 0 1 0 1 0 0 1 0 1 0 1 1 0 1 0 1 1 0 0 1 1 1 0 0 0 1 1 0 1 1 0 1 0 1 0 0 0 0 1 1 1 1 1 0 1 1 0 0 0 1 1 1 1 0 1 0 0 1 1 0 1 1 0 0 1 1 0 0 1 0 0 1 0 0 1 0 1 0 1 1 1 1 1 0 0 1 1 0 1 1 0 0 0 0 1 0 0 0 0 1 1 0 0 1 0 0 1 0 0 1 1 1 1 1 1 1 1 1 1 0 1 1 1 0 1 0 0 0 1 0 0 1 0 0 1 1 1 1 0 0 1 0 1 1 1 0 0 0 1 0 1 1 0 1 1 1 0 0 1 0 0 1 0 0 1 0 0 0 1 1 0 1 0 1 0 0 1 1 1 0 0 0 0 0 1 0 1 0 1 0 0 0 0 1 0 1 0 0 0 1 1 0 0 0 0 0 1 1 1 | NOT POSSIBLE |

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| | 1 0 0 1 1 1 1 1 1 1 1 0 1 | |
| Test Case 9 | 10 1 0 0 0 0 0 0 1 1 0 0 0 1 0 1 1 1 0 0 1 1 1 0 0 0 0 0 1 0 0 1 0 0 0 0 0 0 1 0 1 1 0 0 0 0 0 0 1 0 0 1 1 0 1 1 0 1 0 1 0 0 0 0 0 0 0 1 0 1 1 1 1 0 0 1 1 1 0 0 1 1 0 1 1 0 1 1 0 0 0 1 0 0 0 1 0 0 0 0 1 | NOT POSSIBLE |

Adjacency List

Due on 2014-11-17, 23:59 IST

A graph is abstractly a collection of vertices which are labelled by non-negative integers, and a collection of edges. A graph called an undirected graph if we talk of merely the presence of an edge between vertices i and j , rather than its direction.

For example, the following is a graph:

In this problem, you are given the edges in an undirected graph. An edge is a pair of non-negative integers (i, j) which indicates that the vertex i is connected to vertex j by an edge.

Afterwards, you will be given a vertex number n . You have to output the list of vertices which are connected to n by an edge, in the order in which the edges were input.

Input

You are given the following.

1. The first line contains an integer, E , between 1 and 1000
2. This is followed by E lines, where each containing a pair of numbers i and j where i and j are both non-negative integers $\leq 34,000$. No edge will be listed more than once.
3. The last line contains a non-negative integer $n \leq 34,000$. n is assured to be a vertex listed in one of the E lines in part (2).

Output

You have to output the list of nodes to which n has an edge, in the order in which the edges were input, one line for each vertex.

Sample Test Cases

| | Input | Output |
|-------------|---|---|
| Test Case 1 | 4 1 2 2 3 3 4 4 5 4 | 3 5 |
| Test Case 2 | 10 1 2 1 3 1 4 2 3 2 4 5 1 5 2 5 3 5 4 6 1 1 | 2 3 4 5 6 |
| Test Case 3 | 13 0 4 0 7 0 10 1 8 1 9 3 6 3 10 4 8 4 10 5 9 6 9 7 10 8 10 8 | 1 4 10 |
| Test Case 4 | 325 0 44 0 59 0 100 1 71 1 72 1 93 1 96 1 100 2 14 2 86 2 98 2 99 3 43 3 47 3 87 3 99 4 28 4 49 4 94 | 13 22 37 54 56 59 63 68 75 95 100 |

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| | 4 99 | |
| | 5 60 | |
| | 5 93 | |
| | 5 99 | |
| | 6 74 | |
| | 6 86 | |
| | 6 87 | |
| | 6 88 | |
| | 6 92 | |
| | 6 93 | |
| | 6 100 | |
| | 7 30 | |
| | 7 85 | |
| | 7 89 | |
| | 7 98 | |
| | 7 99 | |
| | 10 20 | |
| | 10 98 | |
| | 10 100 | |
| | 11 63 | |
| | 11 81 | |
| | 11 100 | |
| | 12 58 | |
| | 12 77 | |
| | 12 87 | |
| | 12 89 | |
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| | 12 99 | |
| | 13 60 | |
| | 13 90 | |
| | 13 91 | |
| | 13 93 | |
| | 13 95 | |
| | 13 98 | |
| | 13 100 | |
| | 14 78 | |
| | 14 80 | |
| | 15 86 | |
| | 15 100 | |
| | 16 72 | |
| | 16 90 | |
| | 16 95 | |
| | 17 63 | |
| | 17 92 | |
| | 17 93 | |
| | 17 97 | |
| | 17 98 | |
| | 17 100 | |
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| | 18 100 | |
| | 19 68 | |
| | 19 86 | |
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| | 20 64 | |
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| | 24 | 76 | |
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| | 24 | 100 | |
| | 25 | 38 | |
| | 25 | 84 | |
| | 25 | 88 | |
| | 25 | 98 | |
| | 25 | 100 | |
| | 26 | 49 | |
| | 26 | 88 | |
| | 26 | 94 | |
| | 26 | 99 | |
| | 27 | 50 | |
| | 27 | 98 | |
| | 27 | 100 | |
| | 28 | 49 | |
| | 28 | 74 | |
| | 28 | 99 | |
| | 29 | 42 | |
| | 29 | 76 | |
| | 29 | 77 | |
| | 29 | 90 | |
| | 29 | 99 | |
| | 30 | 46 | |
| | 30 | 80 | |
| | 30 | 89 | |
| | 30 | 100 | |
| | 31 | 70 | |
| | 31 | 98 | |
| | 31 | 99 | |
| | 32 | 76 | |
| | 32 | 81 | |
| | 32 | 95 | |
| | 32 | 99 | |
| | 33 | 64 | |
| | 33 | 94 | |
| | 33 | 100 | |
| | 34 | 57 | |
| | 34 | 71 | |
| | 34 | 95 | |
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| | 34 | 99 | |
| | 35 | 42 | |
| | 35 | 49 | |
| | 35 | 72 | |
| | 35 | 97 | |
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| | 35 | 99 | |
| | 36 | 43 | |
| | 36 | 67 | |
| | 36 | 100 | |
| | 37 | 51 | |
| | 37 | 91 | |
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| | 38 | 57 | |
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| | 38 | 92 | |

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| | 46 | 84 | |
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| Test Case 5 | 325 32000 32044 32000 32059 32000 32100 32001 32071 32001 32072 32001 32093 32001 32096 32001 32100 32002 32014 32002 32086 32002 32098 32002 32099 32003 32043 32003 32047 32003 32087 32003 32099 32004 32028 32004 32049 32004 32094 32004 32099 32005 32060 32005 32093 32005 32099 32006 32074 32006 32086 32006 32087 | 32013 32022 32037 32054 32056 32059 32063 32068 32075 32095 32100 |

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| | 32007 | 32089 | |
| | 32007 | 32098 | |
| | 32007 | 32099 | |
| | 32010 | 32020 | |
| | 32010 | 32098 | |
| | 32010 | 32100 | |
| | 32011 | 32063 | |
| | 32011 | 32081 | |
| | 32011 | 32100 | |
| | 32012 | 32058 | |
| | 32012 | 32077 | |
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| | 32013 | 32060 | |
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| | 32014 | 32078 | |
| | 32014 | 32080 | |
| | 32015 | 32086 | |
| | 32015 | 32100 | |
| | 32016 | 32072 | |
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| | 32016 | 32095 | |
| | 32017 | 32063 | |
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| | 32018 | 32080 | |
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| | 32018 | 32100 | |
| | 32019 | 32068 | |
| | 32019 | 32086 | |
| | 32019 | 32093 | |
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| | 32019 | 32100 | |
| | 32020 | 32064 | |
| | 32020 | 32100 | |
| | 32021 | 32042 | |
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Dec 14 Question 1

Due on 2014-12-23, 05:30 IST

A directed graph is a graph where the edges have a direction - The edge (i,j) represents an edge from i to j only. To specify an edge in the backward direction, there must be an edge of the form (j,i). If this is absent, then there is an edge only in the first direction.

You will be given a directed graph as a sequence of edges. You have to see whether for every vertex, whether the number of incoming edges is the same as the number of outgoing edges.

If every vertex has equal number of incoming and outgoing edges, then print "yes", otherwise print the smallest vertex index which has unequal number of incoming and outgoing edges.

Input

The input consists of a single line with several numbers.

The first number e says how many edges there are. $1 \leq e \leq 3000$.

This is followed by $2 * e$ non-negative edges. Each edge is represented by an adjacent pair i j representing that there is an edge from i to j. ($1 < i < 30000$ and $1 < j < 30000$) i is different from j, but may be lesser than or greater than j.

Output

If every vertex has equal number of incoming and outgoing edges, then print "yes". Otherwise, print the smallest vertex which has unequal number of incoming and outgoing edges.

Sample Input 1

4 0 1 0 2 1 2 2 0

Sample Output 1

0

<i<j<="" body=""></i

Sample Test Cases

| | Input | Output |
|-------------|--|--------|
| Test Case 1 | 142 0 1 0 2 0 4 0 5 0 6 0 8 0 9 0 10 0 11 0 12 1 2 1 3 1 4 1 5 1 6 1 7 1 9 1 10 1 12 2 0 2 1 2 3 2 5 2 6 2 7 2 8 2 9 2 10 2 11 2 12 3 1 3 4 3 5 3 6 3 7 3 8 3 9 3 10 3 11 3 12 4 0 4 1 4 2 4 3 4 5 4 6 4 7 4 8 4 9 4 10 4 11 4 12 5 0 5 1 5 2 5 3 5 4 5 8 5 9 5 10 5 11 5 12 6 0 6 1 6 2 6 3 6 4 6 5 6 7 6 8 6 9 6 10 6 11 6 12 7 0 7 1 7 2 7 3 7 5 7 6 7 8 7 9 7 10 7 11 7 12 8 0 8 1 8 2 8 3 8 4 8 6 8 7 8 10 8 11 8 12 9 0 9 1 9 2 9 3 9 4 9 5 9 6 9 7 9 8 9 10 9 11 9 12 10 0 10 1 10 2 10 3 10 4 10 5 10 6 10 7 10 9 10 11 10 12 11 0 11 1 11 2 11 3 11 4 11 5 11 6 11 7 11 8 11 9 11 10 11 12 12 0 12 1 12 2 12 3 12 4 12 5 12 6 12 7 12 8 12 9 12 10 12 11 | 1 |
| Test Case 2 | 380 0 1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0 9 0 10 0 11 0 12 0 13 0 14 0 15 0 16 0 17 0 18 0 19 1 0 1 2 1 3 1 4 1 5 1 6 1 7 1 8 1 9 1 10 1 11 1 12 1 13 1 14 1 15 1 16 1 17 1 18 1 19 2 0 2 1 2 3 2 4 2 5 2 6 2 7 2 8 2 9 2 10 2 11 2 12 2 13 2 14 2 15 2 16 2 17 2 18 2 19 3 0 3 1 3 2 3 4 3 5 3 6 3 7 3 8 3 9 3 10 3 11 3 12 3 13 3 14 3 15 3 16 3 17 3 18 3 19 4 0 4 1 4 2 4 3 4 5 4 6 4 7 4 8 4 9 4 10 4 11 4 12 4 13 4 14 4 15 4 16 4 17 4 18 4 19 5 0 5 1 5 2 5 3 5 4 5 6 5 7 5 8 5 9 5 10 5 11 5 12 5 13 5 14 5 15 5 16 5 17 5 18 5 19 6 0 6 1 6 2 6 3 6 4 6 5 6 7 6 8 6 9 6 10 6 11 6 12 6 13 6 14 6 15 6 16 6 17 6 18 6 19 7 0 7 1 7 2 7 3 7 4 7 5 7 6 7 8 7 9 7 10 7 11 7 12 7 13 7 14 7 15 7 16 7 17 7 18 7 19 8 0 8 1 8 2 8 3 8 4 8 5 8 6 8 7 8 9 8 10 8 11 8 12 8 13 8 14 8 15 8 16 8 17 8 18 8 19 9 0 9 1 9 2 9 3 9 4 9 5 9 6 9 7 9 8 9 10 9 11 9 12 9 13 9 14 9 15 9 16 9 17 9 18 9 19 10 0 10 1 10 2 10 3 10 4 10 5 10 6 10 7 10 8 10 9 10 11 10 12 10 13 10 14 10 15 10 16 10 17 10 18 10 19 11 0 11 1 11 2 11 3 11 4 11 5 11 6 11 7 11 8 11 9 11 10 11 12 11 13 11 14 11 15 11 16 11 17 11 18 11 19 12 0 12 1 12 2 12 3 12 4 12 5 12 6 12 7 12 8 12 9 12 10 12 11 12 13 12 14 12 15 12 16 12 17 12 18 12 19 13 0 13 1 13 2 13 3 13 4 13 5 13 6 13 7 13 8 13 9 13 10 13 11 13 12 13 14 13 15 13 16 13 17 13 18 13 19 14 0 14 1 14 2 14 3 14 4 14 5 14 6 14 7 14 8 14 9 14 10 14 11 14 12 14 13 14 15 14 16 14 17 14 18 14 19 15 0 15 1 15 2 15 3 15 4 15 5 15 6 15 7 15 8 15 9 15 10 15 11 15 12 15 13 15 14 15 16 15 17 15 18 15 19 16 0 16 1 16 2 16 3 16 4 16 5 16 6 16 7 16 8 16 9 16 10 16 11 16 12 16 13 16 14 16 15 16 17 16 18 16 19 17 0 17 1 17 2 17 3 17 4 17 5 17 6 17 7 17 8 17 9 17 10 17 11 17 12 17 13 17 14 17 15 17 16 17 18 17 19 18 0 18 1 18 2 18 3 18 4 18 5 18 6 18 7 18 8 18 9 18 10 18 11 18 12 18 13 18 14 18 15 18 16 18 17 18 19 19 0 19 1 19 2 19 3 19 4 19 5 19 6 19 7 19 8 19 9 19 10 19 11 19 12 19 13 19 14 19 15 19 16 19 17 19 18 | yes |
| Test Case 3 | 868 0 1 0 2 0 3 0 4 0 5 0 6 0 7 0 8 0 9 0 10 0 11 0 12 0 13 0 14 0 15 0 16 0 17 0 18 0 19 0 20 0 21 0 22 0 23 0 24 0 25 0 26 0 27 0 28 0 29 1 0 1 2 1 3 1 4 1 5 1 6 1 7 1 8 1 9 1 10 1 11 1 12 1 13 1 14 1 15 1 16 1 17 1 18 1 19 1 20 1 21 1 22 1 23 1 24 1 25 1 26 1 27 1 28 1 29 2 0 2 1 2 3 2 4 2 5 2 6 2 7 2 8 2 9 2 10 2 11 2 12 2 13 2 14 2 15 2 16 2 17 2 18 2 19 2 20 2 21 2 22 2 23 2 24 2 25 2 26 2 27 2 28 2 29 3 0 3 1 3 2 3 4 3 5 3 6 3 7 3 8 3 9 3 10 3 11 3 12 3 13 3 14 3 15 3 16 3 17 3 18 3 19 3 20 3 21 3 22 3 23 3 24 3 25 3 26 3 27 3 28 3 29 4 0 4 1 4 2 4 3 4 5 4 6 4 7 4 8 4 9 4 10 4 11 4 12 4 13 4 14 4 15 4 16 4 17 4 18 4 19 4 20 4 21 4 22 4 23 4 24 4 25 4 26 4 27 4 28 4 29 5 0 5 1 5 2 5 3 5 4 5 6 5 7 5 8 5 9 5 10 5 11 5 12 5 13 5 14 5 15 5 16 5 17 5 18 5 19 5 20 5 21 5 22 5 23 5 24 5 25 5 26 5 27 5 28 5 29 6 0 6 1 6 2 6 3 6 4 6 5 6 7 6 8 6 9 6 10 6 11 6 12 6 13 6 14 6 15 6 16 6 17 6 18 6 19 6 20 6 21 6 22 6 23 6 24 6 25 6 26 6 27 6 28 6 29 7 0 7 1 7 2 7 3 7 4 7 5 7 6 7 8 7 9 7 10 7 11 7 12 7 13 7 14 7 15 7 16 7 17 7 18 7 19 7 20 7 21 7 22 7 23 7 24 7 25 7 26 7 27 7 28 7 29 8 0 8 1 8 2 8 3 8 4 8 5 8 6 8 7 8 9 8 10 8 11 8 12 8 13 8 14 8 15 8 16 8 17 8 18 8 19 8 20 8 21 8 22 8 23 | 27 |

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| | 8 24 8 25 8 26 8 27 8 28 8 29 9 0 9 1 9 2 9 3 9 4 9 5 9 6 9 7 9 8 9 10 9 11 9 12 9 13 9 14 9 15 9 16 9 17 9 18 9 19 9 20 9 21 9 22 9 23 9 24 9 25 9 26 9 27 9 28 9 29 10 0 10 1 10 2 10 3 10 4 10 5 10 6 10 7 10 8 10 9 10 11 10 12 10 13 10 14 10 15 10 16 10 17 10 18 10 19 10 20 10 21 10 22 10 23 10 24 10 25 10 26 10 27 10 28 10 29 11 0 11 1 11 2 11 3 11 4 11 5 11 6 11 7 11 8 11 9 11 10 11 12 11 13 11 14 11 15 11 16 11 17 11 18 11 19 11 20 11 21 11 22 11 23 11 24 11 25 11 26 11 27 11 28 11 29 12 0 12 1 12 2 12 3 12 4 12 5 12 6 12 7 12 8 12 9 12 10 12 11 12 13 12 14 12 15 12 16 12 17 12 18 12 19 12 20 12 21 12 22 12 23 12 24 12 25 12 26 12 27 12 28 12 29 13 0 13 1 13 2 13 3 13 4 13 5 13 6 13 7 13 8 13 9 13 10 13 11 13 12 13 14 13 15 13 16 13 17 13 18 13 19 13 20 13 21 13 22 13 23 13 24 13 25 13 26 13 27 13 28 13 29 14 0 14 1 14 2 14 3 14 4 14 5 14 6 14 7 14 8 14 9 14 10 14 11 14 12 14 13 14 15 14 16 14 17 14 18 14 19 14 20 14 21 14 22 14 23 14 24 14 25 14 26 14 27 14 28 14 29 15 0 15 1 15 2 15 3 15 4 15 5 15 6 15 7 15 8 15 9 15 10 15 11 15 12 15 13 15 14 15 16 15 17 15 18 15 19 15 20 15 21 15 22 15 23 15 24 15 25 15 26 15 27 15 28 15 29 16 0 16 1 16 2 16 3 16 4 16 5 16 6 16 7 16 8 16 9 16 10 16 11 16 12 16 13 16 14 16 15 16 17 16 18 16 19 16 20 16 21 16 22 16 23 16 24 16 25 16 26 16 27 16 28 16 29 17 0 17 1 17 2 17 3 17 4 17 5 17 6 17 7 17 8 17 9 17 10 17 11 17 12 17 13 17 14 17 15 17 16 17 18 17 19 17 20 17 21 17 22 17 23 17 24 17 25 17 26 17 27 17 28 17 29 18 0 18 1 18 2 18 3 18 4 18 5 18 6 18 7 18 8 18 9 18 10 18 11 18 12 18 13 18 14 18 15 18 16 18 17 18 19 18 20 18 21 18 22 18 23 18 24 18 25 18 26 18 27 18 28 18 29 19 0 19 1 19 2 19 3 19 4 19 5 19 6 19 7 19 8 19 9 19 10 19 11 19 12 19 13 19 14 19 15 19 16 19 17 19 18 19 20 19 21 19 22 19 23 19 24 19 25 19 26 19 27 19 28 19 29 20 0 20 1 20 2 20 3 20 4 20 5 20 6 20 7 20 8 20 9 20 10 20 11 20 12 20 13 20 14 20 15 20 16 20 17 20 18 20 19 20 21 20 22 20 23 20 24 20 25 20 26 20 27 20 28 20 29 21 0 21 1 21 2 21 3 21 4 21 5 21 6 21 7 21 8 21 9 21 10 21 11 21 12 21 13 21 14 21 15 21 16 21 17 21 18 21 19 21 20 21 22 21 23 21 24 21 25 21 26 21 27 21 28 21 29 22 0 22 1 22 2 22 3 22 4 22 5 22 6 22 7 22 8 22 9 22 10 22 11 22 12 22 13 22 14 22 15 22 16 22 17 22 18 22 19 22 20 22 21 22 23 22 24 22 25 22 26 22 27 22 28 22 29 23 0 23 1 23 2 23 3 23 4 23 5 23 6 23 7 23 8 23 9 23 10 23 11 23 12 23 13 23 14 23 15 23 16 23 17 23 18 23 19 23 20 23 21 23 22 23 23 24 23 25 23 26 23 27 23 28 23 29 24 0 24 1 24 2 24 3 24 4 24 5 24 6 24 7 24 8 24 9 24 10 24 11 24 12 24 13 24 14 24 15 24 16 24 17 24 18 24 19 24 20 24 21 24 22 24 23 24 25 24 26 24 27 24 28 24 29 25 0 25 1 25 2 25 3 25 4 25 5 25 6 25 7 25 8 25 9 25 10 25 11 25 12 25 13 25 14 25 15 25 16 25 17 25 18 25 19 25 20 25 21 25 22 25 23 25 24 25 26 25 27 25 28 25 29 26 0 26 1 26 2 26 3 26 4 26 5 26 6 26 7 26 8 26 9 26 10 26 11 26 12 26 13 26 14 26 15 26 16 26 17 26 18 26 19 26 20 26 21 26 22 26 23 26 24 26 25 26 27 26 28 26 29 27 0 27 1 27 2 27 3 27 4 27 5 27 6 27 7 27 8 27 9 27 10 27 11 27 12 27 13 27 14 27 15 27 16 27 17 27 18 27 19 27 20 27 21 27 22 27 23 27 24 27 25 27 26 27 28 27 29 28 0 28 1 28 2 28 3 28 4 28 5 28 6 28 7 28 8 28 9 28 10 28 11 28 12 28 13 28 14 28 15 28 16 28 17 28 18 28 19 28 20 28 21 28 22 28 23 28 24 28 25 28 26 28 27 28 29 29 0 29 1 29 2 29 3 29 4 29 5 29 6 29 7 29 8 29 9 29 10 29 11 29 12 29 13 29 14 29 15 29 16 29 17 29 18 29 19 29 20 29 21 29 22 29 23 29 24 29 25 29 26 | |
| Test Case 4 | 98 0 24 0 31 0 37 0 38 0 39 1 26 1 29 1 32 1 40 2 14 2 28 2 29 2 37 2 38 2 39 3 22 3 24 3 32 3 37 3 40 4 12 4 38 4 39 5 20 5 32 5 36 5 39 7 22 7 31 7 40 8 29 8 32 8 38 8 39 9 21 9 33 10 18 10 36 10 40 11 14 11 31 11 36 11 38 11 39 12 23 12 34 12 39 14 38 14 39 15 23 15 32 15 38 15 39 16 40 17 23 17 27 17 35 17 40 18 21 19 26 19 39 20 34 20 38 20 40 21 23 21 34 21 39 22 40 23 31 23 33 23 35 23 38 23 40 25 37 25 38 25 39 26 33 26 40 27 31 27 37 27 39 28 32 28 39 29 30 29 38 29 40 30 32 30 35 30 38 30 40 31 32 31 36 31 40 32 39 33 37 33 40 34 40 35 36 | 0 |
| Test Case 5 | 129 0 44 0 47 0 50 1 28 1 41 1 45 1 47 1 49 2 50 3 16 3 29 3 38 3 45 3 47 3 50 4 18 4 42 4 47 4 50 5 49 6 35 6 45 6 50 7 47 7 49 8 18 8 43 8 50 9 13 9 46 9 50 10 41 10 42 10 47 10 48 10 50 11 43 11 49 13 30 13 36 13 42 13 49 14 41 14 42 14 49 15 16 15 28 15 37 15 47 16 25 16 39 16 45 16 50 17 21 17 45 17 50 18 34 18 44 18 47 18 48 18 50 19 32 20 36 20 42 20 45 21 36 21 45 21 46 21 50 22 40 22 41 22 48 22 50 23 43 23 50 24 44 24 49 25 44 25 49 26 41 26 47 26 49 27 29 27 32 27 46 27 | 0 |

47 27 48 27 50 28 30 28 49 29 45 29 48 29 50 30 46 30 49 31 40 31 43
 31 50 32 44 32 46 32 49 33 41 33 49 34 42 34 48 34 49 35 49 36 38 36
 48 36 49 37 45 37 47 37 48 37 49 38 46 39 44 39 50 41 44 41 50 43 45
 43 48 43 49 44 45 44 46 44 47 45 46 45 47 46 47 46 50

December 14 Question 2

Due on 2014-12-23, 05:30 IST

Given a number, print it in the Indian way of writing the numbers with commas. In the Indian system the rightmost comma is placed after three rightmost digits, and then a comma is placed after every two digits from the right.

If a number has less than or equal to 3 digits, then do not put any commas.

For example:

1001921900000 -----> Indian System:

10,01,92,19,00,000

31000 -----> Indian System: 31,000

100 -----> Indian System: 100

12000000 -----> Indian System: 1,20,00,000

Input:

A number with at most 50 digits.

Output:

A single line with the Indian style of writing the number with commas.

Sample Input 1

1021111

Sample Output 1

10,21,111

Sample Test Cases

| | Input | Output |
|-------------|-----------------------------------|--|
| Test Case 1 | 21323141124124 | 2,13,23,14,11,24,124 |
| Test Case 2 | 93184915910001 | 9,31,84,91,59,10,001 |
| Test Case 3 | 324173874231051591051095105910510 | 32,41,73,87,42,31,05,15,91,05,10,95,10,59,10,510 |
| Test Case 4 | 2143413415151513515 | 21,43,41,34,15,15,15,13,515 |

| | | |
|-------------|------|-------|
| Test Case 5 | 1000 | 1,000 |
|-------------|------|-------|

December 14 Question 3

Due on 2014-12-23, 05:30 IST

n prisoners, numbered 1 to n, are standing in a circle to be executed by the Roman army. The centurion will start with a prisoner, skip the current one, and execute the next. The execution proceeds in a clockwise manner. At every point, the next live prisoner is skipped, and the prisoner after that is executed. You have to print the prisoner who will survive at the end.

When n=4, the execution proceeds as follows. First 2 will be executed, then 4. After this, the next prisoner, 1 will be skipped and 3 will be executed. So the survivor is 1.

Input

A single positive integer ≤ 1000 representing the number of prisoners.

Output

The number of the surviving prisoner.

Sample Input 1

4

Sample Output 1

1

Sample Input 2

3

Sample Output 2

3

Sample Test Cases

| | Input | Output |
|-------------|-------|--------|
| Test Case 1 | 1 | 1 |
| Test Case 2 | 4 | 1 |
| Test Case 3 | 123 | 119 |
| Test Case 4 | 89 | 51 |
| Test Case 5 | 742 | 461 |

December 14 Question 4

Due on 2014-12-23, 05:30 IST

A number n is called a primitive root of a prime p if $n^1 \bmod p, n^2 \bmod p, \dots, n^{p-1} \bmod p$ visits all numbers $\{1, 2, \dots, p-1\}$.

(Important: Note that a^b is "a raised to the power b", and not the "^" operator in C. You will have to program this operation yourself, or use appropriate `<math.h>` functions.)

For example, 2 is a primitive root of 5:

$2^1 \bmod 5 = 2$, $2^2 \bmod 5 = 4$, $2^3 \bmod 5 = 3$, $2^4 \bmod 5 = 1$.

2 is not a primitive root of 7.

$2^1 \bmod 7 = 2$, $2^2 \bmod 7 = 4$, $2^3 \bmod 7 = 1$, $2^4 \bmod 7 = 2$.

(At this point, the cycle repeats, hence 3, 5, and 6 will not be encountered.)

Input

The input consists of a single line with two positive integers n and p . $1 < n < p$ and p is a prime number less than 1000.

Output

If n is a primitive root of p , then print "yes".

Otherwise, print the smallest positive number which does not occur in the sequence $n^1 \bmod p, n^2 \bmod p, \dots, n^{p-1} \bmod p$.

Sample Input 1

2 5

Sample Output 1

yes

Sample Input 2

2 7

Sample Output 2

3

Sample Test Cases

| | Input | Output |
|-------------|---------|--------|
| Test Case 1 | 2 17 | 3 |
| Test Case 2 | 311 313 | 5 |
| Test Case 3 | 43 907 | yes |
| Test Case 4 | 971 977 | yes |
| Test Case 5 | 3 79 | yes |