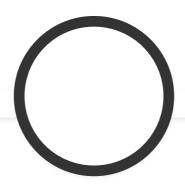
coding hangover

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Spoj(ONEZERO) – Ones and zeros

Posted on May 1, 2015 by vishnujayvel

Problem link: http://www.spoj.com/problems/ONEZERO/

Suppose the number that you want is X. X mod N = 0.

So you need to store only N states i.e. o to n-1. Start with 1.

Implement bfs approach. If the current state modulo is Y, append 0 to it i.e calculate Y*10 + 0 and find its modulo which will lead you to a new modulo state.

Similary append 1 to Y. i.e calculate Y*10 + 1 and find its modulo.

Example: if Y=11 append 0 to it to get 110 and append 1 to Y to get 111.

Have a parent array which will store the previous modulo state from which the current modulo state is reached. This parent array also acts as checkpoint to check if a modulo state is already visited or not.

Have a value array to store the value (1 or 0) that is appended to the parent modulo state to get the current modulo state.

Once the modulo state \circ is reached stop bfs and backtrack using parent array and value array to get the number (i.e smallest multiple of the number n consisting only of digits 1 and \circ beginning with 1).

```
#include <vector>
    #include <list>
3
    #include <map>
  #include <set>
4
    #include <deque>
5
6
  #include <queue>
    #include <stack>
7
  #include <string>
8
    #include <bitset>
10
    #include <algorithm>
11 #include <functional>
    #include <numeric>
12
13
  #include <utility>
14 #include <sstream>
15 #include <iostream>
16
    #include <iomanip>
    #include <cstdio>
17
    #include <cmath>
18
    #include <cstdlib>
19
20
  #include <ctime>
21 #include <cstring>
22 #include <climits>
23
    #include <stdlib.h>
    #include <stdio.h>
24
25
  using namespace std;
26
    #define REP(i,n) for(int i=0; i<n; i++)</pre>
    #define FOR(i,st,end) for(int i=st;i<end;i++)</pre>
27
    #define db(x) cout << (#x) << " = " << x << endl;
28
29
    #define mp make_pair
30
    #define pb push_back
    #define mod 1000003
31
32
    int parent[20005];
33
    typedef long long int ll;
34
    queue<int>q;
```

```
36
     int temp, currentState;
37
    int value[20005];
    void solve(int n){
38
39
             q.push(1);
40
             parent[1]=0;
41
    while(!q.empty()){
42
                      currentState=q.front();
43
                     q.pop();
44
    if(currentState==0){
45
                              stack<int> s;
46
    while(parent[currentState]){
                                       s.push(value[currentState]);
47
                                       currentState=parent[currentState];
48
                              }
49
50
                              s.push(1);
51
    while(!s.empty()){
52
     printf("%d",s.top());
53
                                       s.pop();
54
                              }
55
    printf("\n");
56
    break;
57
58
                      temp=(currentState*10)%n;
59
     if(parent[temp]==-1){
60
61
                              q.push(temp);
62
                              parent[temp]=currentState;
                              value[temp]=0;
63
64
                      }
65
                      temp=currentState*10+1;
66
                     temp%=n;
     if(parent[temp]==-1){
67
                              q.push(temp);
69
                              parent[temp]=currentState;
70
                              value[temp]=1;
71
                      }
72
             }
73
    }
74
75
    int main(){
76
    int t,n;
```

```
77
       scanf("%d",&t);
 78
      while(t--){
 79
      while(!q.empty()){
 80
                                  q.pop();
                         }
 81
 82
      REP(i,20000)
 83
                                  parent[i]=-1;
 84
 85
      scanf("%d",&n);
      solve(n);
 86
               }
 87
      }
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                                                                       TheGridDivTwo
                                   In "spoj"
                                                                       In "topcoder"
spoj bfs ONEZERO
```