Introductory Lecture
Topics: basics, resources, stl, bitwise tricks

League of Programmers

ACA, IIT Kanpur

October 21, 2012

Outline

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- There are handsome rewards - prestige, joy of learning new things, and yes lots of money!

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- C has too restrictive and does not support stl/templates /classes
- Use Library functions and Data Structures instead of writing your own every time

Programming competitions

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- IOPC (IITK), Shaastra (IITM), Bitwise (IITKgp)

Websites for practice

- Compete against Indian coders in live contests: Codechef
- Short Programming Contests: Codeforces, Topcoder
- Problem set Archives: SPOJ, Project Euler, livearchive, acm.sgu.ru and many more

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Overflow

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#include<stdio.h>
int main()
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int a, b;
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- Not all the input constraints are explicit
- Always think about the worst case scenario, edge cases, etc.

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- Segmentation fault
  - Invalid memory reference
  - Using too much memory than provided

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- For example, 10 test cases with $N = 10000$ means $O(N^2)$ is required

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7. Debugging (TLE: time limit exceeded, WA : incorrect solution etc.)

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- Not all operations are equally fast:
  operations on unsigned ints/long long are faster
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- I/O: do NOT use cin/cout for large input output

Some Standard paradigms

- Sorting
- Searching
- Preprocessing
- Divide-and-Conquer
- Dynamic Programming
- Greedy Algorithms
- Graph
- Network Flow
- Backtracking
- Computational Geometry
- Pure maths
- Ad-hoc problems

Outline

Standard template library

Website: `http://www.cplusplus.com/reference`

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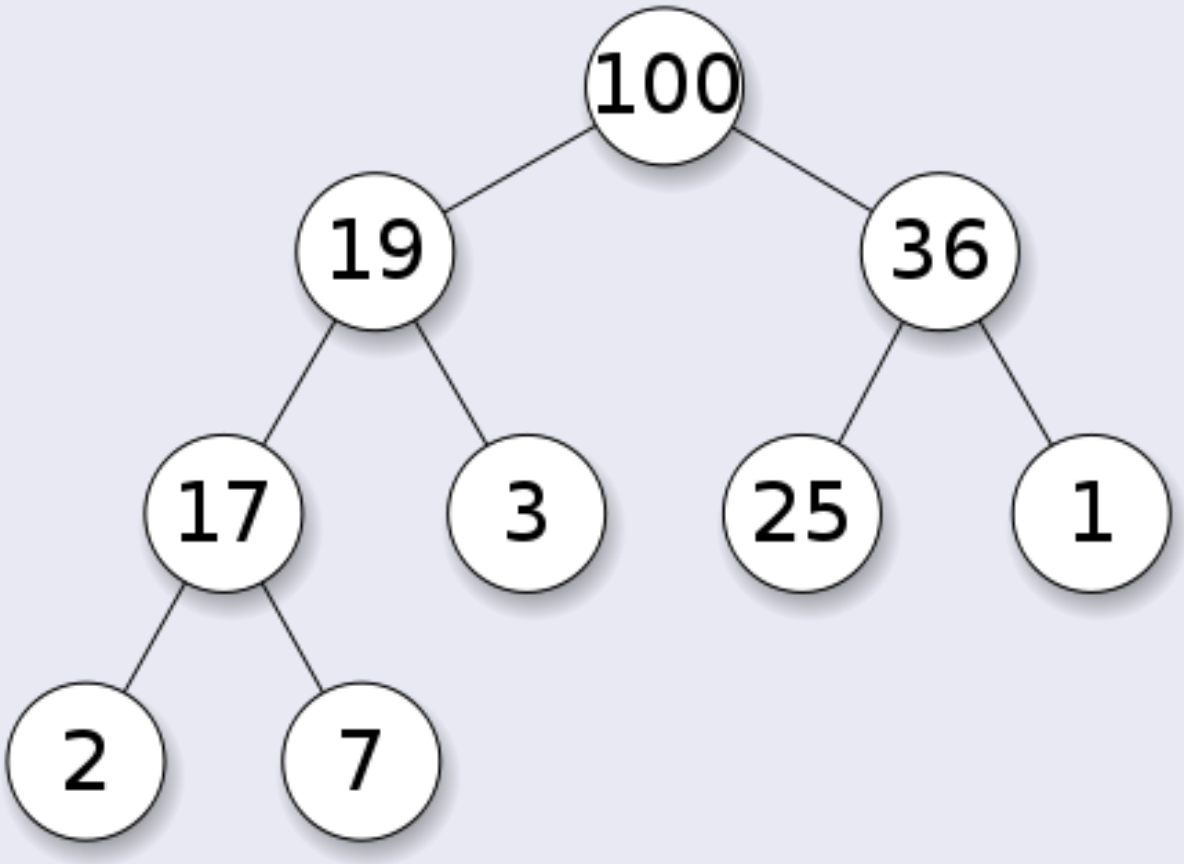
5. May need rearrangement of some nodes

Heap



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3. Speed up the code by upto 100 times. Caution: try to use bitwise operations on unsigned integers only

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   - Check if $|S| = 1$
3. Never multiply or divide or take remainder modulo power of 2

Outline

Problems

Added on the contest on VOC http://ahmed-aly.com/voc/
Contest ID: 2578
Name: ACA, IITK LOP 01
Author: pnkjjindal
Links:

1. http://spoj.pl/problems/WEIRDFN
2. http://www.spoj.pl/problems/HOMO/
3. http://spoj.pl/problems/HISTOGRA
4. http://spoj.pl/problems/SUBSEQ
5. http://www.spoj.pl/problems/NGM2/
6. http://www.spoj.pl/problems/JOCHEF
7. http://www.spoj.pl/problems/SWTHIN/
8. http://www.spoj.pl/problems/LAZYPROG/