



Course Introduction

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Welcome to CS 491 CAP!

Topics for discussion:

- ▶ Introduction
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Introduction and Logistics
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Administrative Items

Meeting Time Friday 14:00 in 1320 DCL

Instructors Jingbo Shang (shang7) and Mattox Beckman (mattox)

Lecturers Uttam, Victor, and Zhengkai

Syllabus TBA

SIG ICPC Team

- ▶ Preparing for 2016 Mid-Central ICPC Regionals
 - ▶ Will discuss and collaboratively solve problems from this seminar's problem sets
- ▶ Meeting Times TBD
- ▶ Chairs: Someone
- ▶ Officers: Others
- ▶ Coach: Jingbo Shang (shang7)
- ▶ Assistant Coach: Mattox Beckman (mattox)
- ▶ Mailing list:
 - ▶ Join us!
 - ▶ `https://www-s.acm.illinois.edu/cgi-bin/mailman/listinfo/icpc-l`



Prerequisites

- ▶ Proficiency in programming C, C++, or Java
 - ▶ CS 125 or equivalent
- ▶ Familiarity with basic data structures ideal, but not necessary (CS 225).
- ▶ Most important: eagerness to learn and practice!!

Why Compete in Programming Contents?

- ▶ It's fun!
- ▶ Opportunity to learn:
 - ▶ useful data structures, algorithms, and mathematical insights;
 - ▶ practical applications of data structures and algorithms;
 - ▶ how to code and debug effectively; and
 - ▶ how to work well on a team.
- ▶ You'll do really well on job interviews!



Programming Contests

- ▶ UIUC ICPC tryouts and practice
- ▶ ACM ICPC
 - ▶ Mid-central Regionals
 - ▶ World Finals
- ▶ Online contests
 - ▶ TopCoder SRMs, CodeForces
 - ▶ Facebook Hacker Cup
 - ▶ Google Code Jam
 - ▶ TopCoder Open
 - ▶ ... and many others ...

Online Judges

- ▶ Real contest problems
- ▶ Immediate Feedback
- ▶ Can emulate contest environment
- ▶ List of online judges:
 - ▶ Peking Online Judge <http://poj.org>
 - ▶ UVa Online Judge <https://uva.onlinejudge.org/>
 - ▶ ACM ICPC Live Archive
<https://icpcarchive.ecs.baylor.edu/>
 - ▶ Sphere Online Judge (SPOJ): <http://www.spoj.com/>
 - ▶ Open Kattis <https://open.kattis.com/>
 - ▶ Saratov State Online Judge: <http://acm.sgu.ru/>
- ▶ **Get an account on each of these!** We will send you a link to collect your online judge IDs later.

Online Contests

- ▶ Occur 3–4 times per month.
- ▶ Top Coder Single Round Matches (SRMs).
<https://www.topcoder.com/>
- ▶ Code Forces
<http://codeforces.com/>

UIUC ICPC Team Meetings

- ▶ SIG ICPC Website:
<http://icpc.cs.illinois.edu/ipl.html>
 - ▶ Contains announcements, practice summaries, and practice resources.
- ▶ Meeting Calendar:
<http://icpc.cs.illinois.edu/calendar.html>
- ▶ **Tryouts**
 - ▶ September 23
 - ▶ October 7. Afternoon 11:00–16:00
- ▶ Practice contests on subsequent Saturdays.
- ▶ Details on <http://icpc.cs.illinois.edu/calendar.html>

Assignments

- ▶ One problem set per week, assigned at end of class.
 - ▶ Problems will be rated by difficulty with a point value
 - ▶ Problems should be submitted on corresponding online judge.
- ▶ Completion of a problem set involves solving 4 points worth of problems.
 - ▶ If you took CS 491 CAP last year, then *you may not use 1 or 2 point problems towards your completion!*
- ▶ Due within two weeks of assignment.
- ▶ **No Extensions!**

NB: Please do not copy-paste code from other sources. You are only hurting yourself if you do!

Grading Policy

- ▶ This class is Pass/Fail.
- ▶ You must complete 10 of 13 problem sets to pass.
- ▶ You may substitute two tryouts or practice contests for problem sets.
- ▶ Grades will be released through `git`. More details to come.

Approach to Solving ICPC Problems

1. **Read the problem statement carefully!**

- ▶ Pay attention to the input/output format specification.

2. Abstract the problem.

3. Design an algorithm.

4. Implement and debug.

5. Submit.

6. AC!

- ▶ (else GO TO 4... or maybe even 3)

Example Problem

- ▶ POJ 1000: A + B Problem
 - ▶ Input: two space separated integers, a and b .
 - ▶ Constraints: $0 \leq a, b \leq 10$.
 - ▶ Output: $a + b$

C / C++ Code for POJ 1000

```
1 #include <stdio.h>
2
3 int main() {
4     int a, b;
5
6     scanf("%d %d", &a, &b);
7     printf("%d\n", a + b);
8     return 0;
9 }
```

Java Code for POJ 1000

```
1  import java.io.*;
2  import java.util.*;
3
4  public class Main {
5      public static void main(String args[])
6          throws Exception{
7          Scanner cin=new Scanner(System.in);
8          int a=cin.nextInt(), b=cin.nextInt();
9          System.out.println(a+b);
10     }
11 }
```



Example Problem

- ▶ POJ 1004 — Financial Management
 - ▶ Input: 12 floating-point numbers, each on a separate line
 - ▶ Output: Average of the numbers, rounded to two decimal places
 - ▶ Note that the answer must be preceded by a dollar sign (\$)!

C/C++ Code for POJ 1004

```
1 #include<stdio.h>
2
3 int main() {
4     double sum = 0, buf;
5     for(int i = 0; i < 12; i++) {
6         scanf("%f", &buf);
7         sum += buf;
8     }
9     printf("$%.2f\n", sum / 12.0);
10    return 0;
11 }
```

Java Code for POJ 1004

```
1  import java.util.*;
2
3  class Main {
4      public static void main(String[] args) {
5          Scanner in = new Scanner(System.in);
6          double d = 0;
7          for (int i = 0; i < 12; ++i) {
8              d += in.nextDouble();
9          }
10         System.out.printf("$%.2f\n", d/12.0);
11     }
12 }
```

Notes about POJ

- ▶ **Read the FAQs!** <http://poj.org/faq.htm>
- ▶ Be aware of the compilers used by POJ and the other online judges.
- ▶ Write and test your code on your local machine, not in the online judge submission box.
- ▶ Use the best free IDE you like.
- ▶ When using `printf` format strings, use `%f`, instead of `%lf`.

Questions?

Course Resources

- ▶ Course Website: <https://pages.github-dev.cs.illinois.edu/sig-icpc/cs491-cap/>
- ▶ Mailing list: <https://www-s.acm.illinois.edu/cgi-bin/mailman/listinfo/icpc-l>
- ▶ Piazza page: (NO solution posts!)
<https://piazza.com/class#fall2017/cs491cap>
- ▶ UIUC ICPC team website: <http://icpc.cs.illinois.edu/>
- ▶ Announcements will be sent to the ICPC mailing list and put on Piazza
- ▶ Course materials will be available on the website