CSE 332S: Object-Oriented Software Development Laboratory

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Course Description

This course will expose you to the syntax, semantics, and standard libraries of the C++ language; to common C++ design and implementation idioms; and to many opportunities to apply the knowledge and idioms you learn through hands-on studio exercises and projects in C++.

All programming in this course will be done in C++, a language in which you can combine the object-oriented, procedural, and generic programming ideas with which you'll gain experience throughout the semester. Since many students enter this course with experience in Java but not C++, the early portion of the syllabus is designed to give you a breadth-first experience of the major capabilities and features of C++ and to assist your progress up the rest of the C++ learning curve. In addition to providing a reasonable coverage of the C++ language overall, this course also will focus on object-oriented programming in C++.
Prerequisites

- CSE247, Data Structures and Algorithms (possible to take concurrently with CSE 332, but please ask)
- Proficiency with Java (e.g., from CSE132), C, C++ or other general-purpose industrial-strength programming language.

Times and Locations

Discussions:

- Section 01: Mondays and Wednesdays 10 - 11:30 in EADS 016
- Section 02: Tuesdays and Thursdays 10 - 11:30 in EADS 016

Message Board

Please submit ALL questions, and concerns of public nature, to the class message board (Piazza). Please also answer other people's questions on the message board!

Please do not e-mail technical questions to your professor or teaching assistants individually: instead, please post on the message board for all to see, consider, and respond.

Please note that the message board is a vital part of your CSE 332 experience. Participation in the message board (i.e., quantity and quality of your posts) may be considered in your participation grade.

The Piazza sign up link can be found here. If you have any trouble registering for or accessing the message board, please let us know right away!

Discussion/Studio Sessions

The discussions and studio sessions will emphasize three main themes: C++ language syntax and semantics; procedural, object-oriented and generic programming techniques; and mastery of useful design, programming, and debugging techniques and tools.

In addition to class meeting dates and topics, assigned readings in the required textbook will be provided as we go through the semester.

Although the sequence of topics listed is a good guide to the course content overall, it may be adjusted somewhat as the semester progresses to emphasize, de-emphasize, or inter-relate certain topics depending on the progress and interests of the students in the course. If you are finding a given topic very easy or very difficult, please let your instructors know.

<table>
<thead>
<tr>
<th>Topic #</th>
<th>Topic</th>
<th>Assigned Readings</th>
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<tbody>
<tr>
<td>1</td>
<td>Course introduction and syllabus</td>
<td>-</td>
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<tr>
<td>2</td>
<td>C++ program structure and development environment</td>
<td>[LLM] Chap. 1</td>
</tr>
</tbody>
</table>
### C++ variables and basic data types
- [LLM] Chap. 2

### Strings, vectors, arrays, and IO
- [LLM] Chap. 3 (and skim 8)

### Functions and the call stack
- [LLM] Chap. 6

### Expressions and Statements
- [LLM] Chap. 4, 5

### Debugging
- 

### Classes and structs
- [LLM] Chap. 7

### The STL: sequential containers and algorithms
- [LLM] Chap. 9, 10

### The STL: associative containers and the IO libraries
- [LLM] Chap. 8, 11

### User defined types and the STL
- 

### Intro to Object-oriented programming
- 

### Dynamic memory
- [LLM] Chap. 12

### Copy control I
- [LLM] Ch. 13 (through section 13.6)

### Copy control II
- [LLM] Chap. 15.7 and 15.8

### OOP design I
- 

### OOP design II
- 

### OOP design III
- 

### Design patterns
- 

### Structural patterns
- 

### Structural patterns
- 

### Behavioral patterns
- 

## Important Dates

At times during the semester, each section may cover a different topic for a given day. Please refer to Piazza for a daily schedule of which topic will be covered by your specific section. However, below is a list of important dates that will be consistent between the 2 sections of the course. As labs are assigned, I will link to them here as well.

<table>
<thead>
<tr>
<th>Date</th>
<th>Note</th>
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<tbody>
<tr>
<td>September 4th</td>
<td>Lab 1 assigned</td>
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<tr>
<td>September 18th</td>
<td>Lab 1 due, Lab 2 assigned</td>
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<tr>
<td>October 2nd</td>
<td>Lab 2 due, Lab 3 assigned</td>
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Labs

There will be 5 lab assignments in this course. The labs will increase in difficulty and value throughout the semester.

Labs are to be submitted electronically via Github, and will be graded and returned to you electronically as well. Each lab submission requires a separate `README.txt` file containing a lab report writeup. Each assignment web page will describe the procedure for submitting the lab, along with the report format and content requirements. Use of this process is required.

Labs 1, 2, and 3 are to be completed individually, though on labs 4 and 5 you will have the option of working in teams of 2 or 3 people. You should please submit your code and a lab report for each lab sufficiently ahead of its advertised due date and time (shown on the lab assignment web page) that normal e-mail delays etc. do not result in your lab being received late.

Labs received within 24 hours after the posted deadline will be accepted with a 10% penalty up front, and labs submitted between 24 and 48 hours after the posted deadline will be accepted with a 20% penalty up front. Labs submitted after that will not be graded, except in the case of documented extenuating circumstances.

Extensions may be granted in advance on a case-by-case basis as long as the circumstances warrant an extension and the request is made sufficiently ahead of the deadline. Extensions will not be granted after the deadline except in very special cases (such as documented medical emergencies).

You may discuss general questions related to your projects with other students and your instructor during studio hours. For additional help please contact your instructor. While you are encouraged to ask for help on particular problems you may encounter during a project, you must design and implement your own solutions, and prepare your own reports. In particular, while discussion of small code fragments related to specific questions is allowed and encouraged, direct sharing, viewing, or other "reuse" of complete code files (especially if done covertly) is strictly forbidden. If you're not sure whether or not sharing a given section of code is ok, please ask your instructors' permission before doing so.

Coding Standards

Many organizations impose coding standards on programmers, and these standards can range from general principles to very specific requirements. In this class, part of the grade for each programming assignment will be based on the CSE 332 Programming Guidelines, which are intended to build good programming habits that will help avoid common mistakes and help make your programs more readable and better organized and documented. As the course progresses, we'll point out relevant ones for each programming assignment, so please re-review it before starting each new programming assignment.
Textbooks and Other Resources

In addition to class meeting dates and topics, assigned readings in the following required textbook are shown for each of the class meetings:


- [GHJV] Erich Gamma, Richard Helm, Ralph Johnson, John Vlissides, *Design Patterns: Elements of Reusable Object-Oriented Software*, ISBN 0321700694

In addition to the required textbook, the following texts may be useful and interesting additions to your programming library:


On-line information sources (please feel free to suggest other good ones):

- The [C++ Reference](http://www.cplusplus.com) page.

Grading

As a rough guideline, 90-100 has historically been the A range, 80-89 the B range, and so on, though depending on the complete distribution the specific grade division points (and addition of + or - qualifiers to the grades near the boundaries) may vary.

For students taking the course pass/fail, a passing grade will be equivalent to a D or better in the course.

See the [Labs](http://classes.cec.wustl.edu/~cse332/) section for a discussion of the labs and how they will be graded.

The exam will be comprehensive and may cover any of the material up to that point in the course. The best way to study for the exams is to keep up with the studio exercises and programming assignments, and to ask lots of questions in the studio sessions throughout the semester.

The last grading component is an evaluation of your participation in the class, and of your application of the tools and techniques discussed in class and labs. This component is separated out to:

1. broaden the evaluation criteria,
2. reduce the weight of the exams a bit, and
3. encourage active participation in discussions/studios.

Percentage completion of the studio exercises (including posting answers to them) will be used as the baseline for evaluating participation grades, though other factors such as attendance and engagement in discussion and studio sessions also may be considered if they differ significantly.

<table>
<thead>
<tr>
<th>Labs</th>
<th>65 %</th>
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<tr>
<td>Lab 1: 8 %</td>
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<td>Lab 2: 10 %</td>
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http://classes.cec.wustl.edu/~cse332/
Cheating

Cheating is the misrepresentation of someone else's work as your own, or assisting someone else in cheating, and will not be tolerated in this course.

For this course, examples of cheating include but are not limited to:

- providing or receiving answers or other assistance during an exam,
- accessing unapproved sources of information during an exam,
- submitting program code written outside this course this semester or by another person not on your team, without specific prior approval by the instructors,
- allowing another student not on your team to copy (or helping them reconstruct) essentially the same solution your team has developed for a programming assignment.

This is a very serious matter. Anyone found cheating will at a minimum lose points equal to the assigned value for the assignment in question (for example if an assignment were worth 10% of the course grade then -10% of the course grade would be assigned), or possibly receive an F for the course. Further action may be taken in extreme cases, possibly including referral to the School of Engineering and Applied Science's formal academic integrity review process.

Furthermore, our policy is that we will make the final determination on what constitutes cheating. If you suspect that you may be entering an ambiguous situation, it is your responsibility to clarify it before we detect it. If in doubt, please ask.

To ensure this policy is implemented consistently and fairly, and that any problems are detected and addressed as early as possible, we may make use of automated program similarity checkers to assess uniqueness and independence of submitted program solutions.

Accommodations based upon sexual assault

The University is committed to offering reasonable academic accommodations to students who are victims of sexual assault. Students are eligible for accommodation regardless of whether they seek criminal or disciplinary action. Depending on the specific nature of the allegation, such measures may include but are not limited to: implementation of a no-contact order, course/classroom assignment changes, and other academic support services and accommodations. If you need to request such accommodations, please direct your request to Kim Webb (kim_webb@wustl.edu), Director of the Relationship and Sexual Violence Prevention Center. Ms. Webb is a confidential resource; however, requests for accommodations will be shared with the appropriate University administration and faculty. The University will maintain as confidential any accommodations or protective measures provided to an individual student so long as it does not impair the ability to provide such measures.

If a student comes to me to discuss or disclose an instance of sexual assault, sex discrimination, sexual harassment, dating violence, domestic violence or stalking, or if I otherwise observe or become aware of such an
allegation, I will keep the information as private as I can, but as a faculty member of Washington University, I am required to immediately report it to my Department Chair or Dean or directly to Ms. Jessica Kennedy, the University’s Title IX Director. If you would like to speak with Ms. Kennedy directly, she can be reached at (314) 935-3118, jwkennedy@wustl.edu, or by visiting the Title IX office in Umrath Hall. Additionally, you can report incidents or complaints to the Office of Student Conduct and Community Standards or by contacting WUPD at (314) 935-5555 or your local law enforcement agency.

You can also speak confidentially and learn more about available resources at the Relationship and Sexual Violence Prevention Center by calling (314) 935-8761 or visiting the 4th floor of Seigle Hall.

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**Bias Reporting**

The University has a process through which students, faculty, staff and community members who have experienced or witnessed incidents of bias, prejudice or discrimination against a student can report their experiences to the University’s Bias Report and Support System (BRSS) team. See: brss.wustl.edu

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**Mental Health**

Mental Health Services’ professional staff members work with students to resolve personal and interpersonal difficulties, many of which can affect the academic experience. These include conflicts with or worry about friends or family, concerns about eating or drinking patterns, and feelings of anxiety and depression. See: shs.wustl.edu/MentalHealth