



Syllabus

CS24000: Programming in C

Spring 2021

Course Information

CRN: 29046 (LE1), 29047 (LE2), 26232 (OL1)

Course credit hours: 3

Prerequisites: CS 18000 (Problem Solving and Object-Oriented Programming)

Instructor

Instructor: Professor Zhiyuan Li

Email: ci@purdue.edu

Online Lectures on Zoom

Click "Online Lecture Access" button on the Content menu bar to retrieve the Zoom access information previously announced.

Instructor Virtual Office Hours

Reminder: All office hours will be held through Zoom. These times are in US Eastern Time (i.e. Purdue time). The Zoom meeting access uses the same meeting ID as the online lectures (Click "Online Lecture Access" button on the Content menu bar to retrieve the Zoom access information previously announced.)

Instructor:

- Monday: 4:30 to 5:30 PM until Week 9.

- Starting Week 9, office hour on Monday is moved to the lecture hours, filling the gap of the lab schedule (which does not have labs on Mondays)
- Wednesday: 4:30 AM to 5:30 PM
- Other days/times by appointment.

TAs and Lab Hours

List of TAs

Communicating with the Teaching Staff

Communication with the teaching team will be mainly conducted on CampusWire, for the sake of timely responses.

Post private messages for any matter that is specific to the posting student, so only the instructor/TAs can see.

If the message is intended for the instructor only (i.e. not the TAs), please send email to the instructor.

If a message is to be seen by a specific TA only, please send him/her email (see List of TAs).

Response Times

You can expect responses as follows:

- Email: within 36 hours
- Campuswire: within 24 hours
- Assignment grades: within 7 days after the due date.

Exceptions: Response times on weekends may vary.

Course Description

The C programming language shares a lot of common syntax with Java, but they have fundamentally different program execution models.

C is tightly coupled with the computer hardware and the operating system, which enables the program to execute with very high efficiency relative to programs written in languages that introduce layers of abstractions. As such, it is not surprising that C continues to be used in applications and system software that need to interact with the

hardware and OS tightly and/or need to meet a stringent execution speed requirement. With the advent of numerous new computing and communication devices embedded in the physical world, the importance of execution efficiency (and its derived energy efficiency) and tight coupling with the hardware will continue to be highlighted.

The potential high efficiency and tight coupling with the hardware, however, comes with certain prices. It opens certain vulnerability and reliability issues that need to be carefully handled. The lack of layers of abstractions also makes C a less than optimal implementation language for large scale software development that require high software productivity, reliability and maintainability.

The primary goal of this course is students to gain a basic understanding of the C language and sufficient programming experience to make them better equipped to identify software projects that suit C and successfully use C to implement their development tasks.

The course work consists of a set of programming and written assignments, a number of quizzes/tests, and a multi-phased project, aimed to learning goals stated in the next subsection.

General Learning Goals of the Course

- Understanding the main difference between the type rules, execution semantics, program compilation and execution environment between Java and C.
- Understanding the basic interface between the operating system, standard library function and the user program in the C compilation and execution environment
- Understanding the memory model and data representation that underlie C program execution semantics
- Review and introduce basic computing algorithms, procedures, and data structures (searching, sorting, recursion, lists, trees, sets, stacks, and so on), with emphasis on the implementation in C.

Prerequisite Courses, Skills, and Knowledge

CS 18000 (Problem Solving and Object-Oriented Programming)

The Textbook

For years, the CS department has required the following textbook for CS240. We assume the students have this book:

The C Programming Language (2nd ed); Kernighan and Ritchie; Prentice Hall, March 1988

ISBN-13: 978-0131103627

Course Structure

This course contains learning modules. Each module represents a unit of instruction. Everything you need for the instruction is located inside each module. The modules are organized on a week-to-week basis. Each week, you will be provided with lecture videos, and the schedule will let you know what work will be due at the end of the week. This work will generally include weekly quizzes, homework and project assignments.

Online Learning Commitment Expectations

You will not be successful in this course if you are not disciplined enough to regulate the time you spend on the course. Online learning requires the learner to take more responsibility in the learning process. Students must be motivated and responsible for keeping up with understanding what is expected and stay on task with due dates for readings, assignments, and other activities. You need to log into the course on a daily basis to check for messages and other important information. Do NOT wait until the last minute to do work that requires you to submit by the due date. Please know, too, that Brightspace goes down for maintenance on a regular basis; you'll find that information-- Brightspace Maintenance Schedule--on the Brightspace home page where your courses are listed.

It is very important that you check for messages every day as electronic communication is essential to an online course. It is absolutely your responsibility to ensure that you check in regularly to see if any announcements have been made.

How I Conduct this Class

I will post slides and lecture notes under each week's module, as well as videos that will go through the slides and notes the way I would in class. ***Please remember that all class content is subject to copyright laws and should not be used for anything other than your own personal use in the course.*** Videos will be in MP4 format, so make sure that you have a way to view those.

Homework

As will be specified further in a later subsection, the grading in this course is divided in two main categories, (i) a course project and (ii) all remaining tasks that include homework

and quiz/tests.

In Category (ii), a set of homework assignments will be assigned throughout the semester. Programming assignments will be the main part of the homework, although written assignments may be posted for suitable topics. The total number of assignments is not determined in advance, but approximately they are posted once a week. The points assigned to each homework is approximately proportional to its level of effort and significance.

As an option, we may give students an opportunity to improve and resubmit a programming assignment (after receiving the original grade) to partially earn back points lost in the original submission. If such an opportunity is granted to the class, we will announce the time window for the re-submission.

Students must read the handout carefully and adhere strictly to the instruction how to submit the work for each assignment. Barring any technical difficulties we may encounter, we expect all programming assignments to be submitted on Vocareum. The link to this submission interface will be provided in the handout.

Please be advised that these programming assignments and the project phases (explained in the next subsection) are designed to take approximately the time allotted, so do not wait until the last minute to start!

Please note that Vocareum is set up to GRADE your project, not to TEST your project. As such, submissions will be limited, and Vocareum may not give you detailed information about what is wrong with your work. You will be provided test cases to test your code locally, and you can add to these tests as necessary. Part of writing code is figuring out how to test it.

Quizzes

Category (ii) of the grading also consists of quizzes (taken on Brightspace), such that we can monitor how well the class follows the materials in a timely fashion. Quizzes normally follow two forms: multi-choice questions and written solutions. We will name the latter kind as "tests" when posting them. Some quizzes and tests may require students to write a short program and report the observations as their answers.

Quizzes and tests will be announced in advance. The students are responsible for checking Brightspace for such announcement and preview the quiz/test summary to see the time window, enforced time limit and other parameters/restrictions. The points assigned to each quiz/test will be approximately proportional to the level of effort and/or significance.

It is also students' responsibility to take the quiz as soon as possible within the time window (which is at least 24 hours). We normally permit up to two attempts, in case there is an internet accessibility issue during the quiz/test, but only the last attempt will be graded. Therefore, take the second attempt only if you absolutely must. Brightspace records all attempts and students connectivity. Hence, we will normally be able to verify students claim if they say both attempts were interrupted.

Under the extremely rare circumstance, if the student experiences accessibility difficulties for the entire time window, the student must report to the instructor as soon as possible, by posting a direct message (for instructors/TAs only) on CampusWire. Such a report will be investigated and handled on a case by case basis.

The total number of points earned in Category (ii) divided by the maximum possible points will be the grade in this category. If bonus points are offered, the earned bonus points will not be added to the maximum possible points. (The total points earned will be capped at the maximum possible points, however. On the other hand, we may create opportunities for bonus points such that the highest earned points in the class equal the maximum possible.)

The Project

The course project in Category (i) of the grading will have multiple phases with their own submission deadlines. The phases are roughly the following: (a) an analysis of the project requirement and estimation of the development effort for various required features; (b) a high-level design of the solution and how to test the solution; (c) a C-specific implementation plan and time estimate; and (d) the actual programming and testing after we summarize students' estimation and post a definitive set of requirements. Step (d) will have several milestones, with their own submission deadlines, to ensure timely progress of the class.

This project carries a heavy weight and is intended to let students practice top-down software development of a nontrivial scale. It also gives the teaching staff an opportunity to go beyond machine-automated grading and better assess and enhance students' ability to design algorithms/data structures and to apply C programming techniques.

The points earned in all phases will be added up and then divided by the maximum possible points, which then will be the grade in Category (i). We keep the option open to designate some phases as bonus.

Work Submission Requirements

Unless announced otherwise, Gradescope will be used for submitting/grading of written homework. Use the **Gradescope Portal** for access. **Vocareum** will be used for submitting/grading the programming projects. Use the **Vocareum Portal** for access. Quizzes and exams will be conducted using **Brightspace**.

Late Work

Due to the high frequency of homework assignments and tightness of the grading/submission schedule, extensions will only be granted in the case of verifiable medical or family emergencies. Any other failures to submit the work on time can be partially mitigated by a possible re-submission for partial credit, if such re-submission opportunity is offered for the specific assignment under appropriate circumstances. (See a previous subsection on Homework.)

Exams

There will be no midterm and final exams this semester.

Grade Calculations

In the following table, we assign the weights to those two grading categories mentioned above. The weighted sum, called the final average, will be used to determine the final letter grade (see "Grade Distribution").

Grade Calculation	
Activity	Percentage of Final Grade
Quizzes, tests, and Homework	60%
Projects	40%

Grade Distribution

The exact grading scale will be determined at the end of the semester, but use the following as a guideline throughout the course. The cut-off may be adjusted if the clustering of the final average in the class justifies that. Any adjustment, however, will be in favor of the students. If the clustering justifies finer grade partition by the use of +/- designation, we will do so. Other than these measures, there will be no "curving" in grading the class.

Grade Distribution

Grade	Score
A	[90-100]
B	[80-90)
C	[60--79)
D	[50-59)
F	< 50

Regrade Requests

Regrade requests must be submitted within 4 days of receiving your graded assignment. A regrade request is valid only if you believe your solution is correct, but was mistaken as incorrect due to the grading system's error or some discrepancy in the output format. It is the responsibility of the students to read the handout thoroughly and carefully and to seek clarification when there is *any* doubt about the requirement and the criteria of correctness. Post such clarification requests as early as possible on CampusWire. Disputing the interpretation of the problem requirement and claiming its lack of clarity after the submission deadline will normally not form a valid base for regrading.

A valid regrade request must explain clearly why you believe a regrade is in order. No regrade requests will be considered if not following the above guidelines. Keep in mind that sometimes when the grader re-examines the submission due to a regrade request, new errors may be found that may result in a lower grade than previously assigned. Correcting such grading discrepancy is to be fair to other students who made the same errors. Please refrain from bargaining with the graders for partial credits, as doing so usually puts other potentially affected students at a disadvantage.

Course Schedule with Activity Due Dates

A detailed course schedule is located in the *Class Schedule* link.

Netiquette

Because online communication generally lacks visual cues common to face-to-face interactions, you are expected to follow these standards. Netiquette is a combination of Network Etiquette. Please abide by the following netiquette rules when communicating with your instructor and peers in this class.

- Be sensitive and reflective to what others are saying.
- Don't use all caps. It is the equivalent of screaming.
- Don't flame - These are outbursts of extreme emotion or opinion.
- Think before you hit the post (enter/reply) button.
- Don't use offensive language.
- Use clear subject lines.
- Don't use abbreviations or acronyms unless the entire class knows them.
- Be forgiving. Anyone can make a mistake.
- Keep the dialog collegial and professional.
- Do not post inappropriate material. Posts deemed inappropriate will be removed and may result in you being suspended or banned from posting.

Academic Guidance During Quarantine/Isolation

Although this course is entirely online, it is essential to mention the university guidelines to follow during the COVID-19 pandemic.

If you become quarantined or isolated at any point in time during the semester, in addition to support from the Protect Purdue Health Center, you will also have access to an Academic Case Manager who can provide you academic support during this time. Your Academic Case Manager can be reached at acmq@purdue.edu and will provide you with general guidelines/resources around communicating with your instructors, be available for academic support, and offer suggestions for how to be successful when learning remotely. Importantly, if you find yourself too sick to progress in the course, notify your academic case manager and notify me via email or Brightspace. We will make arrangements based on your particular situation. The Office of the Dean of Students odos@purdue.edu is also available to support you should this situation occur.

Attendance Policy during COVID-19

All course activities will be online. We follow the Purdue guidelines about course requirements and responsibilities:

Students should stay home and contact the Protect Purdue Health Center (496-INFO) if they feel ill, have any symptoms associated with COVID-19, or suspect they have been

exposed to the virus. In the current context of COVID-19, in-person attendance will not be a factor in the final grades, but the student still needs to inform the instructor of any conflict that can be anticipated and will affect the submission of an assignment or the ability to take an exam. Only the instructor can excuse a student from a course requirement or responsibility. When conflicts can be anticipated, such as for many University-sponsored activities and religious observations, the student should inform the instructor of the situation as far in advance as possible. For unanticipated or emergency conflict, when advance notification to an instructor is not possible, the student should contact the instructor as soon as possible by email, through Brightspace, or by phone. When the student is unable to make direct contact with the instructor and is unable to leave word with the instructor's department because of circumstances beyond the student's control, and in cases of bereavement, quarantine, or isolation, the student or the student's representative should contact the Office of the Dean of Students via email or phone at 765-494-1747. Our course Brightspace includes a link on Attendance and Grief Absence policies under the University Policies menu.

Attendance Policy during COVID-19

The Protect Purdue Plan, which includes the Protect Purdue Pledge, is campus policy and as such all members of the Purdue community must comply with the required health and safety guidelines. Required behaviors in this class include: staying home and contacting the Protect Purdue Health Center (496-INFO) if you feel ill or know you have been exposed to the virus, properly wearing a mask in classrooms and campus building, at all times (e.g., mask covers nose and mouth, no eating/drinking in the classroom), disinfecting desk/workspace prior to and after use, maintaining appropriate social distancing with peers and instructors (including when entering/exiting classrooms), refraining from moving furniture, avoiding shared use of personal items, maintaining robust hygiene (e.g., handwashing, disposal of tissues) prior to, during and after class, and following all safety directions from the instructor.

Students who are not engaging in these behaviors (e.g., wearing a mask) will be offered the opportunity to comply. If non-compliance continues, possible results include instructors asking the student to leave class and instructors dismissing the whole class. Students who do not comply with the required health behaviors are violating the University Code of Conduct and will be reported to the Dean of Students Office with sanctions ranging from educational requirements to dismissal from the university.

Any student who has substantial reason to believe that another person in a campus room (e.g., classroom) is threatening the safety of others by not complying (e.g., not wearing a mask) may leave the room without consequence. The student is encouraged to report the behavior to and discuss next steps with their instructor. Students also have the option of

reporting the behavior to the Office of the Student Rights and Responsibilities. See also Purdue University Bill of Student Rights.

Related Considerations:

1. *A listing of recommended safe practices for the specific class or laboratory setting (other PPE or safety behavior) can be found at the links below.*

- Overarching SOP for Classrooms, Instructional Laboratories, and Experiential Courses

2. *References Supporting Protect Purdue Compliance:*

- Office of the Dean of Students Protect Purdue Compliance Plan: Ask, Offer, Leave, Report

Office of the Dean of Students Managing Classroom Behavior and Expectations

Academic Integrity

Academic Integrity is a critical foundation for any form of higher education, and Purdue University takes this concept seriously. All submitted assignments will automatically be checked for plagiarism. Any student found guilty of plagiarism and/or other forms of academic dishonesty will automatically fail this course and face any additional consequences that the University deems necessary. To know and understand what is academic integrity, what is expected from you, and what you should NOT do, read carefully this document: Academic Integrity.

For this class in particular, all students are required to read our Academic Integrity Policy stated in the handout of Homework 0 and sign/date on its enclosed consent form. Students who submit the signed consent form by its deadline on GradeScope will get bonus homework points. A late submission deadline will also be posted. Failing to meet that deadline will get a point deduction from the total points received in the semester for homework assignments. Without the consent, no work submitted will be graded.

Nondiscrimination Statement

Purdue University is committed to maintaining a community which recognizes and values the inherent worth and dignity of every person; fosters tolerance, sensitivity, understanding, and mutual respect among its members; and encourages each individual to strive to reach his or her own potential. In pursuit of its goal of academic excellence, the University seeks to develop and nurture diversity. The University believes that diversity among its many members strengthens the institution, stimulates creativity,

promotes the exchange of ideas, and enriches campus life. Link to Purdue's nondiscrimination policy statement.

Students With Disabilities

Purdue University strives to make learning experiences as accessible as possible. If you anticipate or experience physical or academic barriers based on disability, you are welcome to let me know so that we can discuss options. You are also encouraged to contact the Disability Resource Center at: drc@purdue.edu or by phone: 765-494-1247.

Emergency Preparation

In the event of a major campus emergency, course requirements, deadlines and grading percentages are subject to changes that may be necessitated by a revised semester calendar or other circumstances beyond the instructor's control. Relevant changes to this course will be posted onto the course website or can be obtained by contacting the instructors or TAs via email or phone. You are expected to read your Purdue email on a frequent basis.

Mental Health Statement

- **If you find yourself beginning to feel some stress, anxiety and/or feeling slightly overwhelmed, try WellTrack.** Sign in and find information and tools at your fingertips, available to you at any time.
- **If you need support and information about options and resources,** please see the Office of the Dean of Students for drop-in hours (M-F, 8 am- 5 pm).
- **If you're struggling and need mental health services:** Purdue University is committed to advancing the mental health and well-being of its students. If you or someone you know is feeling overwhelmed, depressed, and/or in need of mental health support, services are available. For help, such individuals should contact Counseling and Psychological Services (CAPS) at 765-494-6995 during and after hours, on weekends and holidays, or by going to the CAPS office of the second floor of the Purdue University Student Health Center (PUSH) during business hours.

NOTE: The following course policies and expectations will be followed unless they directly contradict something written above.







List of TAs and Lab Schedule

Graduate Teaching Assistants List

Name	Email
Chanwoo Bae	bae68@purdue.edu
Manush J. Bhatt	bhatt16@purdue.edu
Pedro Da Costa Abreu	pdacost@purdue.edu
Eman S. Diyab	ediyab@purdue.edu
Venkata S. Dubagunta	vdubagun@purdue.edu
Md. Shamsul Kaonain	mkaonain@purdue.edu
Kevin Lee	lee1845@purdue.edu
Yefeng Li	li3915@purdue.edu
Muyi Liu	liu413@purdue.edu
Md Nasim	mnasim@purdue.edu
Kendal G. Norman	norman17@purdue.edu
David P. Rowe	rowe4@purdue.edu
Yubo Shao	shao111@purdue.edu
Zixun Yu	yu645@purdue.edu

Geyan Zheng

zheng313@purdue.edu

List of Undergraduate TAs

Email	Last Name	First Name
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agarw170@purdue.edu	Agarwala	Drishti
agarwali@purdue.edu	Agarwal	Ishika
agrawa96@purdue.edu	Agrawal	Sidhartha
bass21@purdue.edu	Bass	Steven
brooker0@purdue.edu	Brooker	Aaron
cdeckowi@purdue.edu	Deckowitz	Cassandra
cparadow@purdue.edu	Paradowski	Cole
dbera@purdue.edu	Bera	Diya
doyle92@purdue.edu	Doyle	Brennan
dudoimeh@purdue.edu	Udo-Imeh	David
freema92@purdue.edu	Freeman	Derek
harmon67@purdue.edu	Harmon	Tara
jain323@purdue.edu	Jain	Isha
jariwala@purdue.edu	Jariwala	Aman
kim2406@purdue.edu	Kim	David
kmorical@purdue.edu	Morical	Kyle
mkausha@purdue.edu	Kaushal	Manit
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nkannian@purdue.edu	Kannianen	Noah
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sbairoli@purdue.edu	Bairoliya	Shivam
sternn@purdue.edu	Stern	Nathan
tran178@purdue.edu	Tran	Trang
yponugot@purdue.edu	Ponugoti	Yamini
zhan3461@purdue.edu	Zhang	Katherine
zheng460@purdue.edu	Zheng	Shirong

PSO_GTA_schedule

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