CS 204 – Advanced Programming – Spring 2023
3 credits

Prerequisite CS201

Description and objectives

This course aims to provide programming experience and to give advanced programming techniques. In this way, students would be more prepared to data structures and several other junior and senior level CS courses. CS204 is a prerequisite course for several CS courses including data structures. Thus, it is a must course for CS students and students who will take advanced CS courses.

The programming language that will be used in this course is C++; we will use C-Lion as the development environment. C-Lion has both Windows and MacOS versions. You have to open a student account https://www.jetbrains.com/clion/ using your sabanciuniv emails in order to activate free student license of C-Lion. You can continue to Visual C++ as the development environment but we cannot provide any portability guarantee for the codes. We do not support VS Code, Xcode or any other development environment. Especially, Xcode is really problematic and you may face severe compatibility issues if you insist on using Xcode.

CS204 heavily depends on CS201. Thus a very good CS201 background is needed. We will **NOT** make a review of CS201 topics.

Topics planned to be covered

- Introduction (overview of basic concepts, Visual C++ environment, preprocessor directives, compiler, compiler options, linker, libraries, debugging)
- Pointers and dynamic memory allocation
- Linked lists
- Stacks and queues
- Templates, templated classes and functions
- Advanced issues on classes and object oriented programming
- Data representation, bitwise operations
- Inheritance, polymorphism and advanced object oriented design
- Exception handling
- Programming with threads
- Visual programming and graphical user interfaces (if time permits, but due to online planning we will not be able to do so)

Instructor

Albert Levi, FENS 1091, ext. 9563, levi@sabanciuniv.edu

Office Hours: whenever I am in my office (generally I am in my office, even during pandemic). Whenever you have a question you can drop by or write me an email or DM via WhatsApp (see the list above); we can always meet online.

Assistants: Detailed assistant information (office hours, etc.) will be available at SUCourse+. All office hours are planned to be held online. See the details at SUCourse+.

Textbook(s)

Main texts are   "Ivor Horton's Beginning Visual C++ 2012", by Ivor Horton, ISBN: 978-1-118-36808-4.

Actually any version of this book is OK, I said 2012 since it can be found electronically. On the other hand, although this book says "Visual C++", it is general enough.

"A Computer Science Tapestry" (CS201 book)

Reference books are   "Starting out with C++ Early Objects", 7th edition, by T. Gaddis, J. Walters, G. Muganda

"Objects, Abstraction, Data Structures and Design using C++" by Koffman and Wolfgang.

We may not stick to the textbooks; you are responsible material covered in class too. Thus it is very important to attend to lectures. Moreover, most students do not need books in this course.

Schedule

Lectures: Monday 9:40-11:30, Wednesday 10:40-11:30. I will be streaming from FENS G077 (auditorium).
Lecture Zoom link: https://sabanciuniv.zoom.us/j/92698631498
Lecture recordings will **NOT** be shared. Mode of lecture delivery may change after early April.

Labs: Sections A1, A2, ~~A3:~~ Thursday 12:40 – 14:30,   B1, B2, B3: Friday 10:40 – 12:30,
C1, C2: Friday 15:40 – 17:30.   A3 will close after add drop; those who are registered to A3 must attend A1 or A2 starting first week. There might be more section closures, please follow my announcements.

All labs will be held online at least until early April. After that, the mode of delivery may be altered. The links and TA information will be made available at SUCourse+. Labs will start first week. Labs will not be recorded and shared.

Homework (Take Home Exams)

There will be 7 programming homework assignments (+/- 1) that might also be considered as take home exams. Late penalty is 10% of full grade (only one late day is allowed). You must submit your own work! No group works! No direct help from any online source is allowed. All of these acts will be considered as plagiarism. Collaboration will not be considered as an excuse for plagiarism!

Formal development environment of CS204 is C-Lion with G++ compiler and C++ 17 standard (For technical help for installation, please refer to the guides at SUCourse+). If you want to use MS Visual Studio, you may do so provided that you specify which version you use at the beginning of the homework. However, there might be some inconsistencies between G++ (C-Lion) and MS VS; these inconsistencies may confuse you and may cause delay in grading. If you want to use VS Code or another compiler that supports G++ as compiler engine, we do not anticipate any problem, but as a standard disclaimer, I have to say "use at your own risk". On the other hand, I know that Mac users prefer to use Xcode, but unfortunately Xcode is extremely problematic when it comes to CS204 topics. Xcode is forgiving for programmer mistakes and even if you think that your code works, there might be some logical errors in your code that Xcode suppresses. That is why, please please please do not use Xcode. If you use it and if your code does not work in our grading setup, you assume all the responsibility.

Grading and Exams (absolutely tentative)

Midterm (32%) – around week 9-10.
Final (40%) – will be scheduled by student resources.
Current plan is to have one Midterm and one Final exam. I plan to have them face to face if university administration allows. However, all these (number of exams, their weight, mode of delivery) might change if we receive further announcement from university administration about how the semester will run. In case of changing plans to have two Midterm Exams, total of exams (72%) will remain intact but the distribution will change.

Homework assignments (20%) – The homework assignments are <u>not</u> of equal weight and individual weights will be determined at the end of the semester. All of them will be considered in grading. Homework grading will mostly be based on correctness of the execution; not based on how big is the mistake or how hard you work for it. Thus please test your code very carefully. No debugging will be done during grading. No code/file changes are allowed after the submission. If you submit wrong file, we cannot grade your work. If you have mistyped even a single character that causes a compilation error, we cannot do anything. Even if you find out your mistake later, we do not allow code changes.

Top Hat and Attendance (8%): There will be a couple of online Top Hat quizzes every week (will start in week 3), some of the grade will come from attendance and some from correctness. Overall TH grade will be multiplied by 1.25 and normalized to 100. Maximum TH grade that a student will not exceed 100. This 25% extra is to cover missing THs due to Internet connection or another reason; we will not provide any make-ups for THs.

Online Lectures and Zoom Etiquette

Please keep your microphone muted unless you are talking to me or asking a question.
It is up to you to turn your camera on.
If you have a question, please speak up and ask. I do not guarantee reading the chat box during the lecture.

Use of SUCourse+ and Communications

We will make announcements via SUCourse+ that you will also receive as emails. Some announcements may be sent as plain email or the quick ones via WhatsApp group.

We have a WhatsApp group for the class that I also participate (of course you might have another one without me). The invite link for it is https://chat.whatsapp.com/HEN503wFtUqKFxCYBzfhSJ

All lecture materials, homework and assignments will be posted at SUCourse+. The submissions will also be there unless otherwise stated.

Lecture materials will be posted as PowerPoint file <u>without</u> annotations made in class. Sample codes discussed in class will also be shared.

Lecture and lab videos will NOT be shared. YOU ARE NOT ALLOWED TO RECORD LECTURES AND LABS EVEN FOR PERSONAL USE.

Other Rules and Remarks

- The highest grade you can get from an individual homework assignment is 1.6 times of your weighted exam average. For example, if your weighted exam average (Midterm and Final) is 62.5% or more, then you may get up to 100 from any of the homework assignments. As another example, if your weighted exam average is 40%, then maximum of each homework is 64 even if you get more than that during grading. We will grade the homework assignments first without considering this, but at the end of the semester, after final exam is announced, we will apply the reductions.
- Students are expected to attend all classes, recitations/labs. In CS204 you will continue to learn a programming language and it is much easier to learn a programming language when a person explains it. You have to spend more time to compensate a missed class. So absenteeism does not buy time.
- Students are responsible for the material covered in class even if it is not part of the lecture notes published on the website (Sometimes we explain some stuff by writing). That is why attendance is important.
- Students are responsible to check their emails (Sabanci University accounts) and SUCourse+ daily for any announcements related to this course.

Homework Submission and Grading Policy of CS 204

- All homework submissions must be done before the specified deadline. If you submit on the exact deadline time, then you are late. That means if the deadline is 21:00, then the latest second that you can submit is 20:59:59.
- Late homework submission is allowed, but only for one day (24 hours). Late submission penalty is 10 points.
- Homework submission must be done only to SUCourse+. Email or other type of submissions are not allowed.
- You will be able to resubmit your homework until the deadline.
- If you resubmit your homework after the deadline, but during the late submission period, your homework will be treated as late.
- **<u>No modification is allowed after SUCourse+ closes.</u>** Thus, please make sure that you've submitted the correct homework. If you submit wrong file or if a crucial file is missing, we cannot grade your homework and you get zero (0). Sometimes, the students argue the local computer's system time as a proof of timely completion of a wrongly submitted homework; we cannot accept such local proofs and we cannot accept any file other the ones submitted to SUCourse+. No exceptions to this rule.
- We do not allow code changes after SUCourse+ closes either. We grade whatever you submit to SUCourse+. This rule holds even if one character change increases your grade from 0 to 100.
- The only exception to no-code-change policy is to fix an unanticipated compatibility problem between C-Lion (G++) and your environment. These cases will be handled case by case and depending on the issue, some grade reductions might be applied. Please keep in mind that you are not allowed to fix algorithmic problems or other coding mistakes in that way.
- Homework grading may be done via a demo and you may be questioned about your homework during the demo.
- **<u>Homework grading is mostly based on correct execution.</u>** We generate some test data for grading and this test data is never given out before the deadline. Moreover, the test data will always be different than the sample

runs given in the homework document. If your homework executes wrongfully against this test data, your grade will be lowered accordingly no matter how big is your programming bug and no matter how hard you work for it. Sometimes the bug is too simple, but it may cause your program to work totally wrong and you may get very low grades. Sometimes, you mistype a character that causes some compilation errors. This are too unfortunate but we have nothing to do. In order to avoid such cases, please test your program thoroughly before the submission and make sure that the submitted version is the most up to date one. And please do not write us to complain about this policy and its outcomes within the semester; you know it at the beginning of the semester and you take this course by knowing this policy.

- **We do not debug your code during grading to understand where the problem is.** As mentioned in the previous bullet, we just test your code and grading is not based on how big your bug is.
- **Testing is your responsibility.** We plan to use CodeRunner embedded to SUCourse+ for most of the homework assignments (but definitely not for all of them). CodeRunner allows you test the code before the final submission and you get feedback about the correctness against some test cases. Moreover, depending on the suitability of homework, we will provide same sample runs together with the project specification as well. However, we do not guarantee that sample runs / CodeRunner test cases cover all of the edge and corner cases. Also keep in mind that the grading test cases will be different than those. Nevertheless, it is your responsibility to test your program against all possibilities in order not to lose points due to some bugs.
- Other grading criteria include modularity of the code, coding style, commenting, efficiency, etc.

Rules to submit a medical report to take a make-up exam in CS 204

- All medical reports must be issued or approved by the health center. Please make sure that external medical reports are given to health center at last at the end of the report coverage. If it is going to be delayed for some reason, please let the instructor know about it.
- If possible, let the instructor know about your medical issue and your unavailability for the exam before the exam.
- If there is a non-medical reason for missing an exam, this issue must be brought to instructor's attention before the exam.
- Those who will take the makeup exam should apply for it by following the course announcements; We will not follow up on the makeup exam takers via the medical reports.
- According to university rules, a person with a medical report cannot attend physical lectures and cannot attend exams.

Summary Policy on Plagiarism and Homework Trading (see the full version at SUCourse+)

A plagiarized homework may or may not be a verbatim copy of another homework. Verbatim copies are of course plagiarized ones. If you use any online tool or code provided by online sources, this is also plagiarism. If a homework is derived from another one by partially changing some parts, this action is also plagiarism. Cooperation and working together is not an excuse. A common fallacy is that the graders cannot catch a program that is developed by partially changing another program. Believe it or not, such programs are caught very easily. There are software products available to catch such cases, and we use them. When a plagiarism case is detected, sanctions are applied to all parties regardless of the actual source of the homework. These sanctions are as follows.

- For the first time, all plagiarized homework owners receive –100 (minus hundred).
- Second time, the student fails the course automatically.

Plagiarism, Homework Trading, Illegal Local and Remote Help and Cheating will not be tolerated. See the related policy at SUCourse+

We may have to revise the course plan according to the countrywide reassessment to be made regarding higher education. This is expected to happen at the beginning of April. The content to be delivered is certain but the method of course delivery, the number and dates of exams, grading scheme and some other details are subject to change.