SABANCI UNIVERSITY
CS 201 - Introduction to Computing
Summer 2021-2022

Instructors

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Course Description

The objective of this course is to introduce students to the field of computing and problem solving with the help of an object-oriented programming language (C++). Hence the course will cover many C++ features in detail as needed so students will also be learning a structured programming language.

Through the lectures, quizzes, take-home exams, and interactive recitations students will learn how to design algorithms based on object-oriented programming paradigms. Evaluation of the solutions in terms of correctness and efficiency will also be covered.

Lectures

Thursday   11:40-14:30 **FENS G077**
Friday   11:40-13:30 **FENS G077**

No recordings of the lectures will be made.
Some recordings may be shared to aid content.

TextBook

A Computer Science Tapestry, 2nd Edition, Owen L. Astrachan
NOT available in the bookstore anymore but available at the library and online.
We may not stick to the textbook all the time, you are responsible for all material covered in class.

Course Tools and Installation Guide

- Install Visual Studio 2012 on Windows
- Install Windows 10 & Visual Studio 2012 on macOS
- C++ Programming with Xcode on macOS

Tentative Grading

Quiz	15%
Take-home Exam	20%
Midterm Exam	30%
Final Exam	35%

Please note that weighted average is not the only criterion in letter grading!

- ❖ All exams and quizzes will be in person/physical/in-class.
    - ➢ All exams will be proctored.
    - ➢ All quizzes will be held during lecture hours.
    - ➢ All quiz dates will be announced at least one lecture prior to the quiz.
        - ■ You will be asked one question on paper.
    - ➢ Midterm exam date and time will be announced during the semester.
        - ■ You will be asked several questions.
    - ➢ We will have a final exam during the regular finals period. Student resources will decide and announce the exact date and time for the exam.
        - ■ You will be asked several questions.
- ❖ For each examination (quiz, midterm, final)
    - ➢ You will be solving/implementing the questions on paper in a limited time.
    - ➢ We will manually grade your answers, but some questions may be non-partial.
    - ➢ Don't worry about timing. You will have enough time to solve each question. However, note that "enough time" does not mean "unlimited time".
    - ➢ Other details will be announced prior to each examination.
- ❖ After any examination (take-home exam, quiz, midterm, final, etc.) some students may be called for an oral exam.
    - ➢ Some students will be selected randomly.

> ➢ Some students will be selected based on any irregularities in their performance and/or the level of work they submit (i.e. using objects or paradigms we have not showed during lectures)

> ➢ All oral exams will be done over Zoom or Google Meet.

>> ■ Each oral exam will be recorded.

> ➢ The students must at all times keep their camera on.

> ➢ The students will share their entire screens (not specific tabs or windows) and do their work on the IDE (VS, Xcode, etc.) that they use regularly.

> ➢ The performance of the student during these oral exams will affect their grades of the examination they have been called upon.

>> ■ Ex: If you are called for an oral exam for Quiz #3, your performance will affect your Quiz #3 grade.

> ➢ If a student fails to show up at an oral exam, or does not obey the rules of camera and/or screen sharing he/she will automatically get 0 (zero) points from that grading item.

❖ At the end of the semester almost all students will have been called to at least one oral exam. Some may be called to multiple oral exams.

❖ At the end of the semester, course grades will be calculated using a predefined point distribution. Variations (or coefficients) may apply according to the average success of the entire class.

> ➢ We constructed a letter grade - point interval mapping based on the previous semesters, in a student-friendly manner (like a <u>very soft</u> catalog grading scheme).

> ➢ We have no intention of releasing the letter grade boundaries.

❖ There will be <u>at least 4</u> take-home exams during the semester. All of the assigned take-home exams will be graded and taken into consideration in the overall grade. Each take-home exam will have equal weight in overall grading.

❖ There will be <u>at least 3</u> quizzes during the semester. We will have written (in-class) quizzes during the semester. The worst of them will be discarded, and the rest of them will have equal weight on grading. In other words, if there are N different quizzes, best N-1 grades will be taken into consideration.

❖ There won't be any make-up for quizzes and take-home exams <u>in any case</u>, including medical health reports and official university activities.

❖ If your exams' *weighted* average is below 30, you will fail the course even if your total grade is equal or above the overall passing grade.

    ➢ Surely, having exam's weighted average greater than or equal to 30 does not mean that you will pass the course.

❖ If you miss all of the quizzes, all of the take-home exams, midterm and final exam as well; then you will get an NA grade.

❖ If you miss the midterm or final exam and if you do not take the make-up exam for that missing exam; then you will directly get an F grade.

GradeChecker Tool

We apply an automated grading process on the take-home exams. You can use GradeChecker (http://learnt.sabanciuniv.edu/GradeChecker/) to check your expected grade, before submitting your take-home exam. Just a reminder, you will see a character ¶ which refers to a newline in your expected output.

GradeChecker can be pretty busy and unresponsive during the last day of the submission. Thus, leaving the submission to the last minute is not a good idea.

GradeChecker and Sample Runs together give a good estimate of how correct your implementation is. **However, we may test your programs with different test cases and your final grade may be different from what you saw on GradeChecker.**

Submit your take-home exam via SUCourse ONLY! GradeChecker is not considered as a submission. Any other methods (paper, email, etc.) are not acceptable, either.

The internal clock of SUCourse might be a couple of minutes skewed, so make sure you do not leave the submission to the last minute. Do not forget that "*No successful submission on SUCourse on time = a grade of 0 directly for that take-home exam.*"

Make-up Policy

<u>No make-up is allowed</u> for the quizzes and/or take-home exams. Students automatically <u>get 0 (zero)</u> from the respective quiz/take-home grade if any of them is missed.

Make-up is only allowed for the midterm and final examination to those with an official report from the University Health Center and to those with an official permission notice from the university for participating in a university event on the date of the exam in question. Students must submit their reports/notices to one of the instructors **before** the exam in question. The ones having other excuses should contact the instructors within the day of the exam to be missed and then the instructors will decide whether these students are allowed to take the make-up exam. Any excuses to be brought to the attention of the instructors after the exam will **not** be considered. **No exceptions to these rules**!

Dates and details of the make-up examinations will be announced later.

Make-up examinations will be written and oral. *Also, please note that the make-up exams are expected to be **much harder** than the regular exams, due to fairness reasons.*

Exam/Submission Review Policy

Students are allowed to object to their midterm and final examination, as well as their take-home exams and quizzes. You can only object to your grades *within 7 days* after the respective grade is announced. Grade bargaining will absolutely not be tolerated.

Plagiarism Policy (Academic Integrity)

Plagiarism means presenting someone else's work as yours. This is a very serious, ethical problem, especially for all online examinations.

During this term all of your submissions (take-home exam, quiz, midterm and final) will be checked against plagiarism.

This part is prepared in order to explain the actions that yield to plagiarism, and the sanctions against it. Most of the actions and sanctions mentioned in this part will also be valid for CS204 course as well; but there might be small differences for the rules among these courses. (http://people.sabanciuniv.edu/levi/cs204/policy_plagiarism.html)

A plagiarized work may or may not be a verbatim copy of another take-home exam/quiz/question/midterm/final. Verbatim copies are of course plagiarized ones. However, if any take-home exam/quiz/question/midterm/final is derived from another one by partially changing some parts, this action is also plagiarism. 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 by using some special software.

From the above paragraph, it should be clear that "similar" submissions (take-home exam, quiz, midterm, final) might be treated as plagiarized ones. It is in your hands to avoid ending up with "similar" submissions. Some precautions are as follows:

- Do not share your work during any examination, wholly or partially.
- Do not discuss the crucial details of your submissions with others.
- Keep any electronic/paper storage that includes your work in a secure place.
- Do not allow other people access your computer through sharing facilities and programs. Some cheaters use network scanners to search for computers with open shares and steal your data (happened in the past).
- Do not help or accept help that yields similar codes.
- Do not share your password.
- Do not enter your password in public computers (in the past, we have seen cases where the passwords and then the take-home exam are stolen).
- Do not make or take any take-home exam, quiz, midterm or final together.
- Do not have a friend or someone else make or take your take-home exam, quiz, midterm or final.

When a plagiarism case is detected, sanctions are applied to all parties regardless of the actual source of the submission (take-home exam, quiz, midterm, final). These sanctions are as follows:

- For the first time, all plagiarized <u>take-home exam</u> or <u>quiz</u> owners receive **-100 (minus hundred)**.
  - Each student will have an opportunity to explain his/her situation.
- Second time, the student fails the course automatically.
- If any plagiarized work is submitted for <u>the midterm or final exam, you will fail the course automatically</u>.

Below you can find a preliminary classification of plagiarizers according to our experience:

- <u>Hard-workers and lazy friends:</u> This is the most common method. In this case, the hard-worker student makes the take-home exam, quiz, midterm or final and gives it to his/her lazy friend(s). **But do not forget both of them are punished.** You have to be able to say "NO", if one of your friends asks for your work. Moreover, please do not get fooled with arguments such as "*I will just have a look at it in order to see the main idea. Then I will do it by myself*". Even if your friend really tries to do so, (s)he may not succeed to make a legitimate submission work and may submit a plagiarized submission work derived from yours (this happened several times in the past). Moreover, your friend may share your hardwork with some other

people and these other people may derive plagiarized submission work out of yours. Please do not forget that your friend who takes your work has nothing to lose. When (s)he is punished, (s)he would just accept it, but you, as the actual person who spent time and effort, will also be punished. This is really a very bad experience (just imagine it and you will see that it is really a very bad feeling). That is why **PLEASE DO NOT SHARE ANY OF YOUR WORK DURING ANY EXAMINATION**.

- <u>Collaborators:</u> More than one people make the same take-home exam, quiz, midterm or final with minor or major modifications. The common excuse for this category is "*we made the take-home exam together*". In CS201, take-home exams are to be done personally. They are not group take-home exams. Another excuse is "*I applied the university motto: creating and developing together*". Our motto is a valid argument <u>if and only if</u> you can write all of the creators and developers name on the final product (the take-home exam in our case) and you can share all the benefits of that product. Since this is not possible in CS201, you cannot create and develop your take-home exams together.

- <u>Deceived cheaters:</u> This category includes people who pay other people to make their own take-home exam, quiz, midterm or final. But the one who takes money makes the same take-home exam, quiz, midterm or final for more than one person. So there are people that do not know each other but submit the same work. Moreover, when we catch a student who pays or gets paid for such a take-home exam, quiz, midterm or final trade, both parties are directly reported for an immediate disciplinary investigation. In this respect, we are in collaboration with freelancer sites, at which programmers are looking for jobs. We are immediately informed when our take-home exam, quiz, midterm or final appeared at these sites. These activities are both against the law and against university disciplinary regulations. All people involved in these activities (both the ones looking for freelancers and/or programmers to have a take-home exam, quiz, midterm or final done and the ones who contact these traders) will both be directly reported to the disciplinary committee and to the prosecutor's office.

- <u>Forgetters:</u> The ones who forget their take-home exam, quiz, midterm or final in public places. "*I forgot it someplace and X took it*" is not a valid argument. You are responsible for keeping your take-home exam, quiz, midterm or final in a secure place. From the discussion above, it should be clear that even if you are not aware that your program files are taken by some other people, you still are responsible and subject to sanctions. Otherwise, the argument of "*I do not know how my files are taken*" is put forward by everybody and we cannot overcome the problem of plagiarism. Moreover, we, as the CS201 instructional team, do not have the right of investigating the actual source and the distribution mechanism of the take-home exam, quiz, midterm or final in order to reach a guilty/not-guilty verdict. This is a legal problem. Therefore, in case of a situation where your

take-home exam, quiz, midterm or final files are taken without your consent, you have the right to report these other people to the dean's office for a disciplinary investigation. After this investigation, if you are proven to be innocent and the other people get some disciplinary penalties, then your grade will be given back. However, without your formal written complaint to the dean's office and a disciplinary investigation, no grades can change.

- <u>Open computer sharers:</u> Some people willingly/unwillingly open some part of their computers' disk or cloud accounts to the shared environment probably for multimedia exchange. However, if you are not careful and experienced enough, you may end up with a situation where your take-home exam, quiz, midterm or final files are also in open share. This way, some other people may steal your take-home exam, quiz, midterm or final files. Such incidents happened in the past. Thus, please do not open your computers' or clouds' share. Our policy is the same as the previous bullet in case your take-home exam, quiz, midterm or final is stolen in this way.

- <u>Password sharers:</u> Passwords are personal information. Even if you share it with your best friend, your private data is no longer secure. Moreover, passwords entered in public computers can be stolen. Thus, please enter your password only on your own computer. Our policy is the same as above, if your password, and then your take-home exam, quiz, midterm or final is stolen in this way.

By this policy, we are not aiming to stop any kind of correspondence and cooperation among the classmates. Of course, the students will talk about their take-home exam and discuss some solutions. However, the students should know where to stop these discussions. In that respect, there is a thin line between plagiarism and cooperation. And unfortunately it is not possible to quantify this line. So when you start cooperation, you are taking a risk of being treated as a plagiarizer. Please keep this in mind and do not get into the forbidden area.

It is the student's responsibility to ensure that (s)he completely understands any material that (s)he submits and that (s)he is actively engaged in the production of the solution. The instructors and TAs of this course reserve the right to ask the students to explain the reasoning behind their work without the presence of any collaborators. Students should know that the ***written submitted work is not the only material that will be graded***. The instructors or TAs might **request a viva** (oral exam), and **grade it instead of the written submitted work**.

Additionally, cases of plagiarism will be directly referred to the Dean's Office for disciplinary action. This course does not tolerate any breach of academic integrity (more info on https://www.sabanciuniv.edu/en/academic-integrity-statement).

Special Note from the Instructors:

Please do not think that this policy has been written under the classical instructor's thought of "*No students can fool us*". We can assure you that when a student cheats or submits plagiarized work, we do not feel anything personally. We are just trying to behave fairly in a crowded course. When a student plagiarizes, (s)he may obtain some points that (s)he does not deserve. We are trying to protect honest students. Thank you in advance for your cooperation.

Additional Notes

Students are responsible for every announcement made in lecture/SUCourse or sent via email. Students are expected to check their Sabanci University mail inboxes regularly as important announcements will be sent to them via email. Not attending the class lecture, not following SUCourse, not checking emails regularly is not an excuse, in case they miss something.

Course Components

Lectures: Lectures are the main building blocks of this course. The content delivered in the lectures will be tested in quizzes, take-home exams, midterm and final examinations. Attendance is not mandatory; however, students are recommended and encouraged to attend the lectures for their own good. Some of the quizzes will be held during the lectures. **OFFLINE** LECTURE MATERIALS (example codes, slides, etc.) WILL BE SHARED WITH THE STUDENTS THROUGH SUCOURSE BEFORE THE REGULAR LECTURE HOURS.

Recitation Sessions: Recitation sessions are student-centered learning hours conducted by TAs of this course. Attendance is not mandatory; however, students are recommended and encouraged to attend the recitations for their own good. Some of the quizzes will be held during the recitations. There will be a total of twelve regular and two exam preparation recitation sessions. Every recitation session will consist of three hours. Each one of the exam preparation recitation sessions will be held before the related examination. In those recitation sections, TAs will solve sample questions to help students get ready for the examinations. Students are expected to bring their laptops to all the recitations. Recitations are quite important to practice the topics. Attendance to recitations is also not mandatory, but we strongly recommend students to participate in the recitations for understanding and/or practicing topics in a better way. OFFLINE RECITATION MATERIALS WILL BE SHARED WITH THE STUDENTS THROUGH SUCOURSE BEFORE THE REGULAR RECITATION HOURS.

Quizzes: Quizzes will take about 15-30 minutes. They can be in the lecture or they can also be in the recitation. Students who turn up late to the class, i.e.

after the quiz starts, can take the quiz but they <u>won't be given any extra time</u> to finish their work. <u>No exceptions will be made to this rule</u>.

<u>Midterm and Final Examinations</u>: There will be only one midterm and one final examination in this course. Students will be graded based on their comprehension of the content and their ability to transfer their knowledge gathered from the lectures, recitations, and take-home exams into practice. The examination dates will be announced later. <u>If any plagiarized work is submitted for the midterm or final exam, you will fail the course automatically.</u>

<u>Take-home Exams</u>: There will be at least 4 take-home exams during the semester, all of which will be graded. All of the take-home exams are designed to bring the students the ability to apply their knowledge into practice. Our experiences show that doing take-home exams with a good understanding is the best way to prepare for the midterm and final examinations. Last but not least, quizzes will mainly be based on the assigned take-home exams. <u>In order to be able to get good grades from the quizzes, we strongly recommend that you should complete your take-home exam before the upcoming recitation.</u>

Tentative Course Outline

1.
   - Introduction to Programming Languages,
   - Data Representation (bits and bytes),
   - Basic programming structure and concepts: identifiers, literals, symbols, variables, screen input/output (cin and cout)
2.
   - Basic data types (int/double/char/bool) and basic arithmetic operations with their precedence,
   - First C++ program with Visual MS Studio
3.
   - Functions with/out return values, function prototypes
   - Parameter passing (pass by value and by reference),
4.
   - Conditional statements (if-else), nested else-if statements,
   - Logical operators (&&, ||, !)
5.
   - String class,
   - Loops (while, for, do-while)
6.
   - Char data type and arithmetic operations
7.
   - File I/O, console stream cin, input and output file streams,
   - String streams

8.
   - Structs, enum,
   - Vectors/arrays and vector operations:
     - Insert/delete to a vector
     - Searching (Sequential, binary)
     - Sorting (selection and insertion sort)
9.
   - Vector of structs, matrix
   - Introduction to algorithm complexity analysis
10.
   - Classes and objects: using Robot class with a ready-to-use GUI (*we may skip the Robot class this semester*)
11.
   - Classes and objects: using and modifying existing classes such as Dice, RandGen, Date and Robot
12.
   - Pointers, linked lists, recursion