PIC 10C SECTION 1, SEPT-DEC, 2020

This course is taught remotely. The course structure and grading practices are set up to allow students in all time zones to participate and earn full credit. However, all times and dates mentioned in this syllabus are based in Los Angeles – on Pacific Time.

Given the unique challenges of a remote course, this syllabus is subject to change at future times, including course structure, grading scheme, etc. An effort will be made to minimize such changes but they may be necessary to improve everyone's experience.

INSTRUCTOR:	Michael Lindstrom (Mike)
OFFICE HOURS:	Mon 16:00-16:50 (10C only) on Zoom Wed 16:30-17:20 (joint with 10A) on Zoom
CONTACT INFO:	*e*: M I K E L [at] math [dot] ucla [dot] edu
LECTURE TIME/LOCATION:	M/W/F 11:00-10:50 PT over Zoom in the Lectures section of CCLE *Recordings will be available on CCLE!*
SECTION WEBSITE:	http://www.math.ucla.edu/~mikel/teaching/pic10c
CCLE:	https://ccle.ucla.edu/ - for course notes, Zoom lectures, and CCLE discussion forums
UPDATES:	Check your email and embedded twitter feed (@mikel_ucla_math)
OPTIONAL RESOURCES:	- *C++ Primer*, Lippman, Lajoie, Moo, 5th Edition - The C++ Standard: https://github.com/cplusplus/draft/blob/master/papers/n4835.pdf
PREREQUISITES:	PIC 10B or equivalent
TA:	Jason Schuchardt
TUTORIALS:	T/R 11:00-11:50 PT over Zoom *Recordings will be available on CCLE!*
CONTACT INFO:	*e*: J A S O N S C H [at] math [dot] ucla [dot] edu
TA OFFICE HOURS:	Wed 14:00-14:50 (on Zoom) Fri 12:00-12:50 (on Zoom)

COURSE FORMAT AND BACKGROUND:

You should be proficient with programming in C++ at an intermediate level. This includes:

- Memory management: stack vs heap, copy and move semantics, lvalue and rvalue references, destructors, RAII, smart pointers, exceptions
- Steams: std::ostream, std::istream, std::ofstream, std::ifstream, std::ostringstream, and std::istringstream
- Separate compilation: header vs cpp files, declarations vs definitions, how to define templates and constexpr objects
- Data structures: linked lists, binary search trees, vectors, maximum heaps, hash tables, and iterators to traverse containers
- Polymorphism: virtual functions, statics vs dynamic types, inheritance from single classes, abstract classes, dynamic_cast
- Algorithms: big-O costing, binary and sequential searches, sorting algorithms
- Templates: template functions and classes with/without default arguments, template type deduction, forwarding references, variadic templates
- Knowledge of C++ Best Practices such as: const correctness, constructor initializer lists, size_t, encapsulation, detailed documentation through commenting, etc.

Notes from PIC 10B are posted on CCLE and you may wish to refer to them to refresh your memory or pick up on some items you may be unaware of. Some class time will be spent quickly reviewing these prerequisite topics, but you may need to do further reading.

Pay attention to the list of items required in the HW_Codes document: these items will be enforced on every homework. If you are unsure of what an item means, you are more than welcome to clarify with your instructor or TA. These items are not meant to trick you. They explicitly list the requirements and style guidelines adopted in this class.

This is an advanced programming course. A level of conceptual and syntactic proficiency is expected.

NOTES/LECTURE/DISCUSSION: Unless otherwise specified, you are responsible for everything covered in the notes, in addition to any material that comes up in lectures or discussion that might not be in the notes.

The course notes/slides effectively serve as a textbook and many important details are written up within the notes. Consider the notes a reading assignment.

The lectures will generally follow the notes in content but may deviate from them to do more demonstrations or discuss a topic at a higher level: you are still responsible for what is in the notes!

The discussions are there to reinforce concepts, go more in-depth into examples, and provide homework guidance.

ZOOM LEARNING: All lectures, discussions, and office hours will be held over Zoom and meeting links will be provided on CCLE. With this modality, there are some things for you to be aware of.

Recording: This class is being conducted over Zoom. Your instructors will be hosting the sessions. The lectures and discussions will be recorded. The recording feature for others is disabled so that no one else will be able to record the sessions through Zoom. No recording by other means is permitted. The sessions will be posted at the CCLE class website. If you have privacy concerns and do not wish to appear in the recording, do not turn on your video. If you also prefer to use a pseudonym instead of your name, please let your instructors know what name you will be using so we know who you are during the sessions. If you would like to ask a question, you may do so privately through the Zoom chat by addressing your chat question to your instructor only (and not to "everyone"). If you have questions or concerns about this, please contact your instructor.

Pursuant to the terms of the agreement between the vendor and UCLA, the data is used solely for this purpose and the vendor is prohibited from redisclosing this information. UCLA also does not use the data for any other purpose. Recordings will be deleted when no longer necessary. However, the recording may become part of an administrative disciplinary record if misconduct occurs during a videoconference.

Further Remarks:

- The office hours will not be recorded.
- You are strictly forbidden from recording any Zoom content: this includes recordings other than through Zoom, screen shots, recording chat dialogue, etc.
- To err on the safe side, one should assume that webcam input (if on), microphone input (if on), display name (whatever is chosen), profile picture, and chat history may be recorded.

Zoom Etiquette: Lectures, discussions, and office hours will take place over Zoom. Here is a list of basic etiquette all students should observe and be aware of:

- For all lectures, discussions and office hours, please mute your microphone unless you need to speak. If you don't do this, there will be background noise and distortions for everyone.
- For lectures and discussions, please post your questions in the chat or wait until your instructor pauses and asks if there are questions before speaking. Please do not interrupt your instructors or other students while they are speaking.
- Ensure that you have a working microphone: this will allow more interactivity by having conversations in class/discussion/office hours. There may also be opportunities for small group work and it would be nice if you could talk to each other, too.
- For office hours, assuming you are dressed properly and what the camera can view is not too personal, it would be nice for you to turn on your webcam. It may also be possible to have webcams on in lecture (do note the recording policy) but pay attention to announcements to turn off the webcams to reduce the quantity of data being transmitted and to improve video compression ratios.
- If you are comfortable with it, using your first name only or first name and last initial would be nice.
- Again, only if you are comfortable with it, having a profile picture for Zoom would be nice, but note it may be recorded.

VIRTUAL LAB: A number of virtual machines will be available to enrolled students. These virtual machines are accessible via a browser and present a Windows desktop with the programs that are required for the PIC courses. However, there is a limit to the number of simultaneous users, so, just as with physical machines, one may have to wait to have access. They will be available 24 hours/day.

Students are encouraged to install the software for the course (Visual Studio 2019) on their own computer, whenever possible.

Details for accessing the virtual machines will be made available at https://www.pic.ucla.edu/

SUPPORT: You are highly encouraged to form study groups, share notes, collaborate, etc. But you must do your own work and typing. Code plagiarism will be taken very seriously.

The purpose of office hours is primarily to discuss/clarify course concepts and for homework-related hints on how to approach a problem. Office hours are not designed as a time for the homework to be done or debugged for you.

GRADING SCHEME:

Your course percentage is computed based on:

- Homework* ~ ^75%
- Participation** – 20%
- Final Exam – 4%
- Max(Midterm, Final Exam) – 1%

* There will be ~10 homeworks assigned over the quarter. The lowest 3 will be dropped, unless one of the last 3 homeworks earns a score below 25%. In that case, only the lowest 2 scores will be dropped. This applies to everyone without exception. Not submitting a homework and/or submitting late automatically results in 0% for that homework. Beware that deadlines posted are in Pacific Time.
~ Over the entire quarter, each student will be allowed one and only one "mulligan" and a homework can be (re)submitted for grading by the TA. A mulligan applies only to the following three cases: (a) resubmitting a homework that failed to compile due to submitting files with the incorrect name and being regraded solely for code output, (b) resubmitting a homework that failed to behave correctly in the graded test case(s) and being regraded only for code output, or (c) submitting a homework late (excepting the final homework where late work will not be accepted). In all cases, the (re)submission must take place within 120 hours (exactly 5 days) of the homework grade release time (for cases a-b) or within 120 hours (exactly 5 days) of the original due date (for case c).
^ For each assignment on which academic dishonesty is detected, the highest homework score will be dropped, the dishonest homework score will result in a grade of 0, without the possibility of being dropped. This is in addition to any penalty assigned by the university.
** Earning 90% of points will amount to 100% here.

Letter grades will be assigned based on the overall course percentage earned without rounding. Below are rough guidelines to the letter grade brackets: earning overall percentages in the brackets below will ensure a letter grade at least as high as indicated. For instance, earning 89% ensures that the final letter grade will be at least a B+, possibly higher.

Overall Course Percentage	**Minimum Letter Grade**
100*	A
[95, 100)	A

[90, 95)	A-
[85, 90)	B+
[80, 85)	B
[75, 80)	B-
[70, 75)	C+
[65, 70)	C
[60, 65)	C-
[55, 60)	D+
[50, 55)	D
[45, 50)	D-
[0, 45)	F

*: students who have 100% overall may be considered for an A+. This A+ may require completion of completing an additional assignment with excellence or passing an oral exam. But an A is guaranteed with 100%.

Participation: Periodically in lectures, you will be posed short multiple-choice/short-answer problems. You will submit via a simple web form at http://www.math.ucla.edu/~mikel/teaching/pic10c/participation .

To accommodate different time zones, you will have until the next lecture/discussion to submit your responses at which point they will be discussed.

Scoring: each answer submitted is worth 1 point, whether or not your answer is correct. Full marks are earned for earning 90% of all points, i.e., if you respond to 93% problems (whether or not you are correct), you will earn 100% here. On the other hand, if you only respond to 60% of questions then you will earn 60/90 = 66.7%. This is really about participation and engaging in the material, and not a serious form of assessment!

Homework: There will be 10 homework assignments to submit on CCLE. You should only submit the raw .cpp or .h files, and they must be named appropriately. Late submissions will not be accepted. The assignments will be posted on CCLE. The assignments are important for your learning!

For some homeworks, the code submitted must compile and run with the GNU C++ Compiler for Linux (g++) on the C++2a Standard. The GNU C++ Compiler can easily be installed on Mac and Windows (by enabling a Linux subsystem as described here https://answers.microsoft.com/en-us/insider/forum/insider_wintp-insider_install/how-to-enable-the-windows-subsystem-for-linux/16e8f2e8-4a6a-4325-a89a-fd28c7841775). Ubuntu is a very user-friendly Linux system to install.

For the first homeworks, the code submitted must compile and run on Visual Studio 2019, which is provided in the PIC Lab and is available for download here https://www.visualstudio.com/downloads/.

If your code does not compile or operate correctly on the GCC Compiler (when required) or Visual Studio 2019 (when requied), marks will be deducted as though it does not compile or operate correctly, regardless of whether it works on other software or compilers!

Homeworks will be scored out of 20 points as below (refer to the **HW_Codes** document for a list of required coding practices and techniques that are required for homework):

Output (8 points): the code output should perfectly match the description given in the homework and follow all specifications.

- 0 ← does not compile *or* the output is far from the desired output *or* the code violates important homework specifications
- 4 ← some progress has been made but the output is far from being correct (e.g. the display format is correct but the output is mostly wrong, the initial output is good but the program soon crashes, etc.)
- 6 ← the output is mostly correct, not a complete match to the desired output (e.g. the program runs but logical errors result in the odd incorrect readout, etc.), no crashes
- 8 ← the output is a perfect match to the desired output.

Other score values are not possible.

Let M = min(12, 2 x Output) if Output > 0;
6 if Output = 0 but the submitted code is mostly complete;
0 otherwise.

Code readability and good coding practices (12 marks): code documentation/commenting, choice of variable names, layout; robustness, efficiency, etc.
Let X = # guidelines that were not met
Readability and Good Practice Score = max(M – X, 0)

Note: if your code does not compile, you can earn at most 30% on a homework. The test cases used are very similar to those given in the sample code. If your code does not compile, it is a sign you never had it working to begin with or never bothered to test your work! Even if your code does compile, if you do not have good coding style, you may only earn 40%. But functionality *combined with* style can earn you 100% ☺

All homework grading queries must be brought up with your TA. Do not email your instructor about the homeworks.

Homework Collaboration Policy: You must identify all collaborators on your assignments and you must do your own work!

Every homework requires the submission of an Honesty Statement. It should be submitted as a file Honesty.txt. Within the file, you must declare:

I, [YOUR NAME], declare that this work is my own. I did this work honestly and can fully stand behind everything that I have written.

I did not copy code from anyone, student or otherwise.

And, if a collaboration took place, also add:

I collaborated with [NAMES OF COLLABORATORS] and I affirm that we all contributed equally in the code.

Under no circumstances does the above declaration entitle you to copy the work of other students! You should also not allow your work to be copied by others as that will only hurt them on exams (and if you are caught, all parties involved may be subject to disciplinary action).

Not submitting Honesty.txt will result in an assignment grade of 0.

Midterm: There will be a midterm on Monday, November 9th. You will have 24 hours to complete it: from Monday, November 9th, 8am to Tuesday, November 10th, 8am.

Final Examination: There will be a final exam taking place on Tuesday, December 15th. The exam will have two components that need to be done between December 15th, 8am and December 16th, 8am. There will be a short, 10-minute, timed component and a more lengthy, written component with no timing.

FORMAL POLICIES:

Explaining Your Work: at any point in the course, you may be required to meet over Zoom to discuss work you have submitted (homework, participation, exam). Being unable to properly explain any part of your work will result in a grade of zero and possible investigation from the university! Refusing to attend the meeting will have the same consequences.

Waitlists and PTEs: All students on the waitlist will be admitted to the course when the waitlist period ends. No PTEs will be given out.

Missing Work: If the final exam is missed for a valid reason and your overall course percentage computed by excluding the final exam is above 75%, you will be given an Incomplete to complete your course work at a later date. University policy states that you cannot pass the course unless you take the final exam.

Valid reasons include one of the following: (a) prior notice of a valid, documented absence (e.g. out-of-town varsity athletic commitment), (b) notification to the instructor within one week due to a medical condition or (c) an emergency. All reasons require written documentation, for example a doctor's or counselor's note stating the student was medically/psychologically unfit to be in school, a copy of a death certificate, or a letter from a coach. A score of zero will otherwise be assigned.

Because multiple homework assignments will be dropped and only 90% of participation points are required to earn 100%, no homework grades or participation scores will be excused, even for a valid, documented absence, even for students who register late. The purpose of dropping the assignments and participation points is not leniency; the purpose is to account for unforeseen circumstances such as sickness, needing to travel, medical appointments, joining late, and the likes.

Center for Accessible Education: If you have a documented disability, please contact the Center for Accessible Education and have them consult with your instructor to ensure you are accommodated. It is your responsibility to do this in a timely manner. Special exam accommodations will not be provided by the instructor or TAs.

Regrading: To request a homework regrading, you must submit an email request to your TA within 5 business days of the homework grade release date (or within 24 hours in the case of the final homework). Your TA will be in charge of the homework regrades and your mark could stay the same, go up, or (in some cases) go down.

All marks are final after a regrade.

Cheating: If a student is suspected of cheating (on a test, assignment, etc.), the department will be notified immediately and severe academic disciplinary action may follow. This could include expulsion from the university!

Examples of cheating include: getting someone else to do one's homework/projects, accessing prohibited materials on an exam, modifying a homework after its submission deadline, starting a test before the designated time, continuing to write when time is up, sharing exam solutions, copying another student's homework verbatim (even if you change the variable names and reorder a few things, that's plagiarizing!), taking work from websites and presenting it as your own, and getting a classmate to respond to the participation problems on your behalf.

Emails and Course Forums: Homework-specific or conceptual questions should be posted on the online discussions at CCLE instead of an individual email to the instructor or TA. Generally emails will not receive a response.

Emails about anything that is answered in the syllabus, in class, or in course announcements will not receive a reply. Also note that some email clients seem to block email replies given from math.ucla.edu: yahoo is particularly bad for this.

Instructor Discretion: The final course marks may be shifted and scaled, and the instructor reserves the right to revise any mark. This syllabus is also subject to change.

GENERAL:

Discussion sections: The discussions are extremely important! The lectures serve to introduce topics, ideas, and build motivation; in the discussions, you will get vital practice and review.

Participation: You are encouraged to get involved in the material, to answer questions in class and on the forums, and to ask questions when you're unclear of what's going on. Don't be afraid to ask questions!

Succeeding: There is no rule that anyone has to fail! There is absolutely no reason you cannot excel in this course if you work for it!

SUCCESS TIPS:

- Attend class or watch the videos. Hearing information live, doing problems, and being able to ask your own questions is important and correlates strongly with exam performance.
- Attend your discussion sections. Lecture time is very limited: there is reason why 2 hours per week are scheduled for this course outside of lectures.
- Do not get behind: once there is a topic you are weak with, it could very well prevent your understanding subsequent topics. The material does build.
- Beware the "familiarity fallacy": just because you've seen a topic before, doesn't mean that you have mastered it.
- Make use of office hours and CCLE discussions.
- Don't be afraid to speak with your instructor or TA: you are not just a number!