

Course Information

Welcome to Foundations of Computer Programming (the powers-that-be have decided to file this under QRMT), your gateway to computer science. This is an introductory programming course so there are no prerequisites – in particular, no prior programming experience is required, though it helps to be “computer literate”.

By the end of the course you should be able to write useful programs. There will be a deep focus on programming concepts and the evolution of computational thought, so besides learning how to write cool artifacts and the philosophy of computation, you will also learn some theory about things like control structures (looping, recursion, etc.), data types (arrays, strings, etc.), basic algorithms (sorting, searching, etc.), and some advanced ideas (this will depend on how fast the class moves). We will also delve into some rudimentary complexity theory. Most importantly, you will learn how to think like a programmer and be able to fearlessly tinker with code!

We will also cover fundamental algorithmic ideas that have had (and continue to have) a major influence on the evolution of computer science and several other disciplines, ranging from mathematics to biology to the social sciences. We hope you will enjoy the class!

Note: If you already possess some coding ability, and want to improve, or to start coding more seriously in a principled manner, please take the “Introduction to Computer Programming” (CS 1101) course offered in the spring. This course is not a replacement for 1101. This is an FC, intended for general audiences; 1101 is more intensive, and meant for people who are planning for a major in CS.

This handout describes basic course information and policies. Most of the sections will be useful throughout the course. The main items to pay attention to **NOW** are:

- ◇ Make sure you are signed up properly on the Ashoka LMS.
- ◇ Join the Google Classroom.
<https://classroom.google.com/c/MTMxMzcwODQxNjcy?cjc=tbougrh>
- ◇ Add this course on gradescope using the code **MXBP42** to submit written assignments. Instructions for coding assignments will be included within those documents.
- ◇ Please note, and carefully adhere to, the collaboration policy for homework.

1 Course Management

We will be using Gradescope to submit and grade assignments, and the course website (Google Classroom) to post course material, answer questions, and for announcements, such as changes to office hours.

2 Staff

The lecturer for this course is Debayan Gupta (debayan.gupta@ashoka.edu.in). Please call me Debayan; if you feel uncomfortable with that, I also answer to Prof. Gupta, though I prefer the former.

Our TAs (in order of first names):

Abhinav Nakarmi

Anisha Maria

Onish Garg

Reuel Kandathil

Saloni Mehta

Soham De

Sona Maharjan

3 Prerequisites

This is an introductory course, so we will not be imposing any prerequisites.

4 Lectures

Lectures will be held live online on Google Meet from 11:50 A.M. to 01:20 P.M. on Tuesdays and Thursdays. You are responsible for material presented in lectures, including oral comments made by the lecturer. Lectures will be recorded. While we will post some lecture notes that may be helpful in the event of an unavoidable absence, the notes are meant to augment the lecture, not replace it.

4.1 Syllabus

Look at “topics.txt” for a basic list of topics we will cover in lecture; note that some of these will span multiple lectures while others might only take a fraction of one. Some of

these may also be covered in a different order.

4.2 Discussion Sections

There will be recitation (discussion) sections, but these will start around the third week of classes. Sections will generally be 1-2 hours per week, depending upon content, and be supervised by a TA. Each student will be assigned a TA who will be their first point of contact for general queries (other than posting online, of course).

These sections are critical: you'll do supplemental readings, clarify doubts, bulldoze irritating installation bugs, etc. You are responsible for material presented in recitations.

4.3 Office Hours

There will be lots of office hours pretty much every day of the week. We strongly recommend that you make efficient use of your and your TAs' time by sending your questions to the TAs at least a few hours beforehand.

5 Problem Sets

Problem sets (aka homework/assignments) will be assigned throughout the semester. We expect to have one problem set every two weeks at the beginning of the semester, progressing to one every week towards the end, as we move into more interesting and complex material. Overall, we shall probably have around 7 problem sets. The due date will always be written on the problem set itself. Homework must be turned in by 10:00 P.M. on the due date.

- **Late submissions:** We will not usually allow late submissions unless there are major extenuating circumstances, such as a medical issue.

The only way to submit late is to email your solution to your TA and cc the exception-handling czar. We will sometimes allow small (< 30 min) delays, but we intend to keep an eye out for habitual offenders and may reject such submissions arbitrarily.

- **Discount Policy:** Your lowest homework score will be ignored.
- **Office Hours:** There will be no office hours on the day a problem set is due.
- **Submission Format:** Solutions to written parts of the problem set should be submitted online to gradescope in a single PDF file. If the file does not clearly indicate

which parts the solutions refer to, or has parts missing, it is assumed that the student did not attempt that part of the problem. Therefore, before submitting, make sure all of your work is included in the PDF file.

Start each question on a new page and mark the top of the page with the following: (1) your name, (2) the question number, and (3) the names of any people you worked with on the problem (see Section 10), or “Collaborators: none” if you solved the problem entirely by yourself.

The problem sets may include exercises that should be solved but not handed in. These questions will be clearly marked and are intended to help you master the course material. Material covered in exercises will be tested on exams.

- **Regrade Requests:** Any student who feels that a problem set was not graded properly may submit a regrade request through Gradescope within one week of the graded assignment being returned to the student. Please note the following before submitting a regrade request:
 1. You should carefully read the posted solutions for the problem in question.
 2. Indicate which rubric items you deserve (if applicable), where in your solution write-up you address them, and explain why you deserve extra points. Any regrades without justification will not be processed.
 3. The course staff reserves the right to regrade the entire assignment, and your grade may increase or decrease as a result of a regrade.
 4. **Important:** Lots of requests from the same person (hoping to somehow get extra points) and nonsensical requests will be dealt with harshly. This sort of thing wastes the time of the course staff and means that we can't help other students who might actually need it.

If you are still unsatisfied with your grade after the regrade, please email Debayan.

6 On the Importance of Clarity

You should be as clear and precise as possible in your write-up of solutions. Understandability of your answer is as desirable as correctness, because communication of technical material is an important skill.

A simple, direct analysis is worth more points than a convoluted one, both because it is simpler and less prone to error, and because it is easier to read and understand. Sloppy answers will receive fewer points, even if they are correct, so make sure that your solutions are concise and well thought-out.

Sometimes, you will be asked to “give an algorithm” to solve a certain problem. Your write-up should take the form of a short essay. A topic paragraph should summarize the problem you are solving and what your results are. The body of your essay should provide the following:

1. A description of the algorithm in English and, if helpful, pseudocode (if you don't know what that is, we'll go over it in class!).
2. A proof (or indication) of the correctness of the algorithm.
3. An analysis of the asymptotic running time behavior of the algorithm (again, we'll learn more about this later).
4. Optionally, you may find it useful to include a worked example or diagram to show more precisely how your algorithm works.

Remember, your goal is to communicate. Graders will be instructed to take off points for convoluted or obtuse descriptions.

7 Exams

There will be two open-book midterm exams in the course, in October and November. These will be 1.5 hours long; the second exam will be cumulative. There will be no final exam during exam week in December; instead, we will test your understanding of the concepts learned in class through the puzzle day event (see the next section).

More details about your exams will be released closer to the date. (We'll have lots of tiny features to minimise cheating.)

Attendance at the exams is mandatory. Legitimate conflicts can be discussed with the teaching staff but must be due to extenuating circumstances and discussed in advance. If a student misses either exam due to an emergency, make-up exams may be offered at the discretion of the instructor.

Regrade requests. Any student who feels that a quiz or final exam was not graded properly may submit a regrade request. The request must be made online (via gradescope) by the announced deadline. The request should include a detailed explanation of why she or he believes that a regrade is warranted. Please make sure you read the solutions carefully before requesting a regrade.

8 Puzzle Day

At the end of the semester, we will host a day-long coding and puzzle-solving scavenger hunt. You will hear more about this later in the semester. Attendance is mandatory and we cannot offer a make-up for this event.

9 Grading Policy

The final grade will be calculated as follows:

Homework	30%
Exam 1	25%
Exam 2	25%
Puzzle Week	20%

You will receive a mid-semester update on your performance and your likely grade soon after your first midterm exam.

10 Collaboration Policy

We encourage you to collaborate with your peers to deepen your understanding of the course material. However, you should approach collaboration *on problem sets only* with care, and follow the guidelines below. **Copying from online resources, books, or notes from previous versions of this or other classes is strictly forbidden — copying will be considered a serious offense and dealt with accordingly.**

1. **You should spend at least 30–45 minutes trying to solve each problem entirely by yourself.** If you find yourself unable to progress, you can seek help, either by approaching the TAs, or by using the forum, or by collaborating with your peers.
2. **Do not be a Spoiler.** If you already solved the problem, do not give away the answer to your friend. The best way you can help your friend is to give hints and allow her or him the pleasure of coming up with the answer her/himself. Our past experience has overwhelmingly shown that students who do not attempt the problem sets on their own generally perform poorly on the exams, and thus in the class overall.
3. **You must write up each problem solution entirely by yourself without assistance,** even if you collaborate with others to solve the problem. Doing otherwise will be considered plagiarism, an academic offense with serious repercussions. You are

asked on problem sets to identify your collaborators. If you did not work with anyone, you should write “Collaborators: none.”

It is a serious violation of this policy to submit a problem solution that you cannot orally explain to a member of the course staff. Plagiarism and other dishonest behavior cannot be tolerated in any academic environment that prides itself on individual accomplishment.

If you have any questions about the collaboration policy, or if you feel that you may have violated the policy, please talk to one of the course staff. Although the course staff is obligated to deal with cheating appropriately, we are far more understanding and lenient if we find out from the transgressor himself or herself rather than from a third party or on our own.

Needless to say, **no collaboration whatsoever is permitted during exams.**

11 Textbook

We will not use any textbook. The internet is your friend.

Course notes will be posted every week. In addition to this, there will be readings from various books, but the necessary excerpts will be provided. If you’re interested and want to read the rest of some of these books, first check the library, then ask the professor to help you find a copy.

12 Advice and resources for effective learning

Because of the conceptual nature of the material, just attending lectures and doing the homework are unlikely to be sufficient for learning all the concepts. **Setting aside time to do the reading and to study your notes from lecture and recitation is generally necessary to truly learn and internalize the material**, and to be able to apply it in new ways later in the course as well as for the rest of your life.

Homework is essential for learning the material. Rather than thinking of problem sets as just a requirement, recognize them as an excellent means for learning the material, and for building upon it. Spread out the time you have to work the problems. Many people learn best by reading the problems long before they are due, and working on them over the course of a whole week; they find that their minds make progress working the problems in the background or during downtime throughout the day. Few people do their best learning the night before an assignment is due. Work with others if that is helpful, but with the goal of learning first and solving the problems second. **It is worth**

reading the posted homework solutions, even if you received full credit. Often the clarity of explanation or details of implementation are different from the way you were thinking about things in ways that can improve your learning.

Don't hesitate to ask for help. This class is largely conceptual, and the concepts tend to build on one another. **If you are having trouble understanding the material, it is important to catch up rather than risk falling further behind.** We can help.

Office hours are a particularly useful mechanism for learning material and working through difficulties on problem set assignments. Moreover, if you have questions about the course or problem sets, please use the forum as opposed to emailing an individual TA or lecturer—that will give you a better chance of getting a speedy response.

This class has great material, so HAVE FUN!