Swimming and Computer Science Bootcamp
Summer 2023

To contact professors:

Zaire Hayes   zhayes@gunnchos.com

Phone: 260-999-3806

Virtual Office hours: By appointment

Edmund Gunn, Jr.   egunnjr@gunnchos.com

Phone: 219-805-3048

Virtual Office hours: By appointment

Program Prerequisites

Students must complete a prep assessment.

Program Description

The summer bootcamp program integrates intensive study and conditioning to empower participants to excel in any field they choose. Ordinarily, the topics we'll cover would span three to four semesters. However, our bootcamp condenses this information into one rigorous summer, providing a more compact yet comprehensive learning experience. This program will demand approximately 100 hours of engagement, split between academic study and physical training. Flexibility is at the core of our approach, and participants can schedule study modules at their discretion, thanks to the program's online component. On average, expect about 10 hours of commitment each week until the beginning of the next school year. Attendance is mandatory at online meetings and training sessions held at the local YMCA.

Please remember, the goal here is to prepare you for future challenges, whether in academia, professional life, or your personal endeavors. This bootcamp aims to build resilience, tenacity, and a winning mindset. We look forward to embarking on this journey with you!

Program Objectives

By the end of the Summer Bootcamp Program, students should have:

1. Basic understanding of how data is represented and how computers use and modify this data to solve problems.
2. Introduction to computational thinking: the ability to develop simple algorithms, involving decisions and repetition, to solve problems.
3. Experience in coding simple programs in C++, learning fundamental programming concepts such as variables, operators, and loops.
4. Basic understanding of object-oriented programming concepts, as applied in C++.
5. Experience in coding, using, and modifying fundamental data structures, primarily using C++.
6. A high-level understanding of how an operating system works.

7. An introduction to fundamental concepts in discrete math.

8. The confidence and resilience to outperform in any situation, whether in the classroom, swimming pool, or beyond.

Program Structure

Our Summer Bootcamp Program is primarily conducted online, but also includes physical training sessions at the local YMCA. All course materials and interactions will occur through Discord.

- The program will run for six intensive weeks, from the start date to August 21st. During this time, you will engage with new material each week, ensuring consistent progression throughout the course.

- Zaire will deliver lectures on Discord from 2:00pm to 3:00pm Eastern Time every Thursday and Friday. These sessions will be recorded for those unable to attend the live lectures.

- Edmund will lead physical training sessions at the YMCA from 4:00pm to 6:00pm Eastern Time on Mondays, Tuesdays, and Wednesdays, depending on his work schedule.

- In addition to online lectures and physical training, participation is crucial for success in this course. Students are expected to actively engage in weekly discussions on Discord and in person.

- To evaluate your progress, we will have two exams during the program. These exams will be online and self-paced, taken at a time of your choosing within a given window. The first exam will be Thursday 7/27, while the second exam will occur 8/17.

Please make sure to mark your calendars and arrange your schedules to accommodate these sessions and exams. Our goal is to make this a rewarding and educational experience, providing a well-rounded foundation in computer science and physical training.

Grade Breakdown (%)

- Weekly Homework Assignments: 40 %
- Exam 1: 30 %
- Exam 2: 30 %

Certificates

Certificates will be issued to individuals who receive a grade of C-, C, C+, B-, B, B+, A-, A, A+ in our Summer Bootcamp Program. For those who receive a B+ or higher, the Certificate will state "with Distinction." This bootcamp course is non-credit, but provides invaluable experience and a head start for those interested in computer science or related fields. Please note that this certificate exemplifies your commitment to learning, improving, and excelling in diverse areas.

Interaction Policy

As a participant in our Summer Bootcamp Program, you are expected to be an active learner both online and offline. This includes participating in the online lectures and discussions on Discord, physical training sessions at the YMCA, and any other interactive activities we organize. Your active engagement will contribute to your personal growth and the overall experience of the bootcamp, while fostering a supportive and collaborative learning environment for everyone involved.

Program Communication

Announcements - Announcements will be posted regularly on Discord, which serves as our central platform for this Summer Bootcamp Program. Be sure to check the announcement channel regularly as it will contain important information about assignments, schedule changes, and other program matters.

Discussion Forums – Discord also serves as our discussion platform. This is an excellent way for you to engage with the course material and with your peers. You are expected to read the discussions and participate thoughtfully. Zaire and Edmund will monitor all discussion posts and provide content clarification and feedback when necessary.

Direct Communication – If you have questions or concerns about the course, you can post them in the designated Discord channel or message Zaire or Edmund directly. If you're unable to attend a lecture or practice, it's your responsibility to get the notes from your peers, unless you notify us in advance about your situation.

Lectures and Practices – Online lectures will take place twice a week, and physical training sessions will be held three times a week at the YMCA. These sessions will be an opportunity to learn new topics, practice what you've learned, and ask questions. All lectures will be recorded and available on Discord. Your presence, either in real-time or through watching recorded sessions, is mandatory.

Weekly Virtual Meetings – If you have questions or concerns about the course, you can post them in the designated Discord channel or message Zaire or Edmund directly. If you're unable to attend a lecture or practice, it's your responsibility to get the notes from your peers, unless you notify us in advance about your situation.

Netiquette – When participating in this program, it's crucial to interact with your peers in a respectful and professional manner. Always use appropriate language (no netspeak) in your Discord posts and messages. Please show respect to your classmates at all times, even if you disagree with their ideas.

Readings

The following resources will be referred to during the course. Purchasing these texts is not mandatory, but you may find them useful for deepening your understanding. I will provide necessary content derived from these resources throughout the course.

1. "Problem Solving with C++", Ninth Edition, Walter Savitch, University of California, ISBN-10: 0133591743 • ISBN-13: 9780133591743

2. "Discrete Math" book from zyBooks.com

3. "Data Structures and Algorithms in C++", Fourth edition, Mark Allen Weiss, Pearson, ISBN-13: 978-0132847377, ISBN-10: 013284737X

4. "Modern Operating System", Fourth edition, Andrew S. Tanenbaum, Pearson Prentice Hall, ISBN-13: 978-0133591620, ISBN-10: 013359162X

Recommended books (not required):

1. "Introduction to Algorithms", 3rd Edition, Cormen, Leiserson, Rivest, and Stein, MIT Press, 2009; ISBN-13: 9780262033848; ISBN: 0262033844.

2. "Computer Networking: A Top-Down Approach", 7th Edition, James Kurose, Keith Ross, Pearson.

3. "Discrete Mathematics and Its Applications", 7th Edition, Kenneth H. Rosen, The McGraw Hill Companies, 2012; ISBN: 978-0-07-338309-5.

Online libraries can also be a valuable source of information, should you need to refer to them. You can access NYU's central library here: http://library.nyu.edu/
You can access NYU Tandon's Bern Dibner Library here: http://library.poly.edu/

Program requirements

Participation is key to your success in the SCSBootcamp. You must attend or watch all virtual meetings in the same week that they occur. Regularly log into Discord, read all announcements, complete all assignments on time, and actively participate in Discussion Forums.

First Exam, **July 27th 2023**, will account for 30% of your grade. Topics covered will include: number systems, data types, expressions, branching statements, iterative statements, logics, proofs, algorithm analysis, functions, arrays, strings, pointers, dynamic storage, recursion, induction, basic counting and combinatorics, and probability.

Second Exam, **August 17th 2023**, will account for 30% of your grade. Topics covered will build upon Exam 1 material and will additionally include: object-oriented programming, file processing, searching and sorting, linked lists, stacks and queues, trees and binary search trees, introduction to OS Concepts, processes & threads, thread concurrency and deadlocks, memory management, introduction to networking, overview of OSI/RM, physical layout of networks, and the application, network and transport layers.

Tentative List of Topics Covered in the Program:

- Fundamentals of system hardware
- Number Systems
- Compilation and Execution process
- Data types and Expressions
- Branching statements
- Iterative Statements
- Intro to algorithm analysis and Order of growth
- Coding functions, Abstraction and Runtime stack
- Arrays
- Strings

- Pointers and Dynamic allocation
- Logic
- Proofs
- Sets
- Mathematical Functions
- Introduction to Counting
- Discrete Probability
- Induction
- Recursion
- Searching and Sorting
- Object Oriented Programming concepts
- File Processing
- Linked Lists
- Stacks and Queues
- Trees and Binary Search trees
- Intro to OS Concepts
- Processes & Threads
- Thread concurrency and deadlocks
- Memory Management
- Introduction to Networking
- Overview of OSI/RM
- Physical layout of networks
- Application Layer, Network Layer and Transport Layer

Statement of Disability

If you are a student with a disability who is requesting accommodations, please contact Edmund Gunn, Jr. at 219-805-3048 or egunnjr@gunnchos.com . You must be registered with Edmund to receive accommodations.

gunnchOS 3k MLV Policies and Procedures on Academic Misconduct *(from the gunnchOS 3k MLV Student Code of Conduct)*
gunnchOS 3k MLV Policies and Procedures on Academic Misconduct

A. Introduction: The gunnchOS 3k MLV SCSbootcamp encourages academic excellence in an environment that promotes honesty, integrity, and fairness, and students are expected to exhibit these qualities in their academic work. It is through the process of submitting their own work and receiving honest feedback on that work that students may progress academically. Any act of academic dishonesty is seen as detrimental to the educational atmosphere and will not be tolerated. Furthermore, those who breach these rules on academic integrity will be sanctioned under this Policy. Students are responsible for familiarizing themselves with this Policy on Academic Misconduct.

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

B. Definition: Academic dishonesty may include misrepresentation, deception, dishonesty, or any act of falsification committed by a student to influence a grade or other academic evaluation. Academic dishonesty also includes intentionally damaging the academic work of others or assisting other students in acts of dishonesty. Common examples of academically dishonest behavior include, but are not limited to, the following:

> 1. Cheating: This includes but is not limited to intentionally using or attempting to use unauthorized notes, books, electronic media, or electronic communications in an exam; talking with fellow students or looking at another person's work during an exam; submitting work prepared in advance for an in-class examination; having someone take an exam for you or taking an exam for someone else; violating other rules governing the administration of examinations.

> 2. Fabrication: Creating and/or falsifying experimental data, research results, or citations. This includes but is not limited to the invention of data or sources for academic assignments or research.

> 3. Plagiarism: Intentionally or knowingly representing the words or ideas of another as one's own in any academic exercise. This includes failure to attribute direct quotations, paraphrases, or borrowed facts or information to their original sources.

> 4. Unauthorized Collaboration: Working together on work that was meant to be done individually. While collaboration can be a valuable learning tool, sharing answers or work when an assignment is meant to be completed independently is not allowed.

> 5. Duplicating work: Presenting the same work for more than one project or in more than one class, unless express and prior permission has been received from the course instructor(s) or research adviser involved.

> 6. Forgery: Altering any academic document, including, but not limited to, academic records, admissions materials, or medical excuses.

> 7. Unauthorized Assistance: Providing or receiving assistance on academic work or an examination beyond what is explicitly allowed by the course instructor.

> 8. Sabotage: Deliberately impeding the academic progress of others. This can include damaging another student's work or preventing their access to resources.

> 9. Misrepresentation: Providing false information or lying to a faculty member with the intent to improve your grade or standing in the course.

Always remember that maintaining academic integrity is of utmost importance and actions that compromise it will not be tolerated. If you are unsure whether an action would be considered academically dishonest, please contact Zaire or Edmund before proceeding.

C. Collaboration and Academic Honesty: While we encourage students to collaborate and discuss homework assignments to better understand the course material, the line between collaboration and

academic dishonesty can be blurry. Collaboration does not involve one student having direct knowledge of another student's solution to a problem or one student taking the results of a discussion and presenting them as their own. Collaboration is about learning from each other in order to develop your own understanding of the material. Direct copying of homework assignment solutions is considered academic dishonesty and is not permitted under any circumstances.

Please note that examinations are to be completed individually. Any collaboration during an examination is considered academic misconduct.