

Fall 2025 ITLS-3350-IO1 Syllabus

ITLS Syllabus 3350

Computational Thinking

Instructor

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Course Description

What *is* computational thinking? Computational thinking is a relatively new concept that involves understanding how humans use computers to think through problems, gather and analyze data, create tools for others to use, and, of course, code things. To do this we will need to develop some understanding of how humans have designed computers and the various software that control them. By the end of the course you should have a basic understanding of several areas of computational thinking, ideas encapsulated by fun words like: data, abstraction, algorithms, planning structures, user interface. You should also have an idea of 1) how those apply to your daily life (i.e., how you can apply computational thinking to regular everyday problems with and without computers; how computers affect your everyday life) as well as 2) how to apply these concepts to designing for others (with and without computers).

You do not need any prior programming or computer background before taking this course. The course has been designed for novices in those areas. That said, many of you may have months or years of experience in one or more coding languages or in thinking computationally (whether you know it or not). For this reason if you do not find Scratch as a programming platform challenging, you can choose another programming option like HTML for which there are alternative coding quests or *propose* another programming platform in which to fulfill coding assignments and co-design programming projects with the professor that will meet course requirements. Designing your own coding quests will take initiative on your part but may be much more interesting for you in the end.

A big portion of this course is built on supporting **choice and interest**. You can choose from *many* options in at least $\frac{1}{3}$ of the assignments. This will work best if you take ownership of your own learning and think about what topics interest you the most, what areas you lack expertise in, and what areas might link best to the scholarly and career directions you want to go. In addition, you can choose between three areas for the final project or paper: traditional research, Scratch project, prototyping project, or education project.

If you find that you still aren't being challenged in the course, please talk to the professor about a proposal for a custom track that will allow you to go deeper into the general topics of the course in a unique way. I am open to ideas and proposals if you take the time to meet with me and propose something.

The course is designed to be a steady workload of 8-9 hours a week as a 3-credit upper division undergraduate course. If you are investing that amount of time and struggling, please meet with the professor ASAP to figure out how to make things smoother for you. If you are not investing that amount of time on average every week, then

that's on you.

Finally, this course is a work in progress. It will not be perfect, and I hope that you will help me evaluate what is working best, what can be improved, and perhaps what new things I can add to next year's course. Your inputs in this area will 1) demonstrate high levels of reflection into learning and design and 2) make a difference for future students. In other words: help me debug this course, iterate on it, and revise it to be better.

Course Objectives

By the end of this course, you will be able to:

1. Explain the application of computational thinking across multiple domains.
2. Apply the foundational principles of computational thinking to frame a question and devise a solution in a particular field of study.
3. Understand and use the fundamental concepts of data types, such as control structures, functions, and arrays. Understand the role of data in AI and machine learning.
4. Demonstrate a fundamental understanding of software development methodologies, including modular design, pseudo code, flowcharting, structure charts, structured programming, and algorithmic design.
5. Identify the impacts of computing and information technology on humans and the importance of human-centered design, including understanding the differences between User Interface and User Experience (UI/UX).

Course Resources

All required texts and coding tools are free and listed in the course modules.

Course Requirements

Each student will:

1. Participate in weekly core assignments, including weekly participation in discussion boards.
2. "Choose your own adventure" in where to invest time and effort in choice-based assignment (Skill Tree Quests).
3. Complete a final project or paper. Final project/paper choice must be approved by the professor in advance.

NOTE: Projects, coding, reading, etc, are due **FRIDAYS** at midnight MT. Discussion posts and responses are due **TUESDAYS** at midnight MT. Remember these two weekly deadlines!

Every assignment in this course is read and reviewed *personally* by the instructor and/or teaching assistants. All feedback (and grading) is done by hand.

Evaluation Methods and Criteria

There are four major groupings of assignments in this course.

1. **Core Quest Requirements (25%).** These are assignments that everyone must complete, including various coded and "unplugged" (meatspace) projects, readings, reflections, and discussion boards.
2. **Skill Tree Quests (25%).** These are assignments that you get to choose from. You will need to get a certain number of "points" across the semester, but you can choose from a variety of assignments under different topics. This will allow you to invest more time in areas where you are more interested or want more experience.
3. **Heroes' Deliberation & Reflection (20%).** At the end of every unit is a discussion forum where you as heroes & questers get to share your insights with each other. You will make connections from across the unit (lectures,

interviews, coding quests, meatspace quests, skill tree quests) and write 2-3 goodly paragraphs on what you're learning. Then you'll read others' reflections and learn from them too. Don't forget to comment - discussion requires a back-and-forth.

4. **Final Boss Project/Paper (30%).** There are four choices for the final project or paper, all of which require instructor approval (via a personal conversation by phone or video): 1) a traditional term paper on a topic of your choice, 2) a computational project, 3) a design prototype of an app, or 4) an instructional unit about some aspect of computational thinking.

Course Schedule/Outline

Our course will proceed in groupings by topic:

Week 0: Level 0—Introductions

Weeks 1-2: Level 1—Computational Thinking

Weeks 3-5: Level 2—CT, Control Structures, & Pseudocode for Planning

Weeks 6-7: Level 3—Understanding Data

Weeks 8-9: Level 4—Problem Solving (aka Algorithms)

Weeks 10-11: Human-Centered Design & UX/UI

Weeks 12-14: Final Boss Battle—Final project prep

Finals Week: Final project/paper due.

Grade Scheme

The following grading standards will be used in this class:

Grade	Range
A	100 % to 93.0%
A-	< 93.0 % to 90.0%
B+	< 90.0 % to 87.0%
B	< 87.0 % to 83.0%
B-	< 83.0 % to 80.0%
C+	< 80.0 % to 77.0%
C	< 77.0 % to 73.0%
C-	< 73.0 % to 70.0%

Grade	Range
D+	< 70.0 % to 67.0%
D	< 67.0 % to 60.0%
F	< 59.0 % to 0.0%

Attendance and Excused Absences Policy

Throughout the term, you will be asked to participate in discussions and activities online. Students are *required* to post questions and comments on weekly discussion boards. Be thoughtful, ask questions, provide answers, really dig into the texts and ideas!

Your overall participation in the discussion boards and in short online activities will be considered when determining your level of participation at the end of the semester. Also, note that Canvas maintains automatic records of what resources you use on the website. Your use of online materials will be considered when determining your level of participation.

Learning is innately social. In an online class it can be difficult to develop the social connections that we take for granted in face-to-face courses. Thus participation in discussion boards, comments on your peers' assignments, and other creative means that you find are tremendously important to your *own* as well as our class community's learning.

Late policy

In general late work is accepted with a 50% reduction in points (i.e., for half-credit).. If you have an emergency or situation that is affecting your coursework, please reach out quickly to let the instructor know so that you can receive support. You should do this with all of your professors so that we can figure out how to help and adjust as needed.

Early in the semester, the instructor often provides opportunities to revise on-time work for more points, especially as students are learning the expectations in the course. In general, it is better to turn something in on-time and revise it with feedback than to be late.

Library Services

All USU students attending classes in Logan, at our Regional Campuses, or online can access all databases, e-journals, and e-books regardless of location. Additionally, the library will mail printed books to students, at no charge to them. Students can also borrow books from any Utah academic library. Take advantage of all library services and learn more at libguides.usu.edu/statewide. (<http://libguides.usu.edu/statewide>)

AI Use

You are permitted to use ChatGPT and other generative AI tools to assist you in gathering information, writing drafts, and revising your writing. However, **you are expected to include a disclosure and reflection statement** at the end of your assignment describing which AI tool you used and how you used it. For example, "*ChatGPT was used to draft about 50 percent of this assignment and to provide revision assistance. AI-produced content was edited for accuracy and style. I provided _____ as a prompt/search/etc. The AI-produced content was initially only partially correct so I revised parts including _____, _____, and _____.*"

Consider the thinking skills and practices you need to learn as a student from this course. AI often requires significant debugging (in the instructor's experience, it often takes more work to debug AI-driven writing or code than it does to do the work manually) . Also, recent (2024-25) research has shown that timing matters in using AI. Using it first, often acts as a crutch for the brain, and limits cognitive development (i.e., people do not develop or even lose certain thinking skills). If used as a later support, then in some cases using AI may support cognition. [Though it's similar to revising work after receiving feedback from an instructor, and since you're already going to receive that feedback...]

Take-home message: Consider the outcomes you are seeking as a student and use supports and tools available to you to make the most out of this course.

- Remember that office hours are available on request! Those usually save students much time!

Again: Every assignment in this course is read and reviewed personally by the instructor and/or teaching assistants. All feedback (and grading) is done by hand, personally.

Classroom Civility

Utah State University supports the principle of freedom of expression for both faculty and students. The University respects the rights of faculty to teach and students to learn. Maintenance of these rights requires classroom conditions that do not impede the learning process. Disruptive classroom behavior will not be tolerated. An individual engaging in such behavior may be subject to disciplinary action. Read Student Code Article V Section V-3 (<https://studentconduct.usu.edu/studentcode/article5>) for more information.

University Policies & Procedures

Appropriate Use of Canvas and Other IT Resources

Canvas and all other course technologies are information technology services provided as tools to further the mission of the university. By using these services, users agree to comply with USU Policy 550: Appropriate Use of Computing, Networking, and Information Resources (<https://www.usu.edu/policies/550/>), and the accompanying Terms of use for USU IT (https://usu.service-now.com/aggies?id=kb_article_view&sysparm_article=KB0015388), resources, as well as Article V-3.B.25.c (<https://www.usu.edu/student-conduct/student-code/article5>) of the USU Student Code. Using course technologies in ways that are inconsistent with the university's mission or are disruptive will not be tolerated. Disruptive behavior includes any activity that interferes with either the faculty member's ability to conduct the class or the ability of other students to profit from the instructional program.

Classroom Behavior

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Academic Freedom and Professional Responsibilities

Academic freedom is the right to teach, study, discuss, investigate, discover, create, and publish freely. Academic freedom protects the rights of faculty members in teaching and of students in learning. Freedom in research is fundamental to the advancement of truth. Faculty members are entitled to full freedom in teaching, research, and creative activities, subject to the limitations imposed by professional responsibility. Policy 4002: Academic Freedom and Professional Responsibility (<https://www.usu.edu/policies/4002/>), further defines academic freedom and professional responsibilities.

Academic Integrity – "The Honor System"

Each student has the right and duty to pursue his or her academic experience free of dishonesty. To enhance the learning environment at Utah State University and to develop student academic integrity, each student agrees to the following Honor Pledge:

"I pledge, on my honor, to conduct myself with the foremost level of academic integrity."

A student who lives by the Honor Pledge is a student who does more than not cheat, falsify, or plagiarize. A student who lives by the Honor Pledge:

- Espouses academic integrity as an underlying and essential principle of the Utah State University community;
- Understands that each act of academic dishonesty devalues every degree that is awarded by this institution; and
- Is a welcomed and valued member of Utah State University.

Academic Dishonesty

The instructor of this course will take appropriate actions in response to Academic Dishonesty, as defined the University's Student Code. Acts of academic dishonesty include but are not limited to:

- **Cheating:** using, attempting to use, or providing others with any unauthorized assistance in taking quizzes, tests, examinations, or in any other academic exercise or activity. Unauthorized assistance includes:
 - Working in a group when the instructor has designated that the quiz, test, examination, or any other academic exercise or activity be done "individually;"
 - Depending on the aid of sources beyond those authorized by the instructor in writing papers, preparing reports, solving problems, or carrying out other assignments;
 - Substituting for another student, or permitting another student to substitute for oneself, in taking an examination or preparing academic work;
 - Acquiring tests or other academic material belonging to a faculty member, staff member, or another student without express permission;
 - Continuing to write after time has been called on a quiz, test, examination, or any other academic exercise or activity;
 - Submitting substantially the same work for credit in more than one class, except with prior approval of the instructor; or engaging in any form of research fraud.
- **Falsification:** altering or fabricating any information or citation in an academic exercise or activity.
- **Plagiarism:** representing, by paraphrase or direct quotation, the published or unpublished work of another person as one's own in any academic exercise or activity without full and clear acknowledgment. It also includes using materials prepared by another person or by an agency engaged in the sale of term papers or other academic materials.

For additional information go to: [ARTICLE VI. University Regulations Regarding Academic Integrity](https://www.usu.edu/student-conduct/student-code/article6)
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Discrimination and Sexual Misconduct

General Overview

USU strives to provide an environment for students and employees that is free from [discrimination](https://www.usu.edu/equity/non-discrimination) (<https://www.usu.edu/equity/non-discrimination>) and [sexual misconduct](https://www.usu.edu/equity/sexual-misconduct/Sexual-Misconduct-Terms) (<https://www.usu.edu/equity/sexual-misconduct/Sexual-Misconduct-Terms>). If you experience sexual misconduct or discrimination at any point during the semester inside or outside of class, you are encouraged to contact the USU Title IX Coordinator via Distance Education room 400 in Logan, 435-797-1266, titleix@usu.edu (<mailto:titleix@usu.edu>), or at [equity.usu.edu/report](https://www.usu.edu/equity/report) (<https://www.usu.edu/equity/report>). You can learn more about the USU resources available for individuals who have

experienced sexual misconduct at [sexualrespect.usu.edu](https://www.usu.edu/sexual-respect/) (<https://www.usu.edu/sexual-respect/>). Resources for individuals who have experienced discrimination are listed at [equity.usu.edu/resources](https://www.usu.edu/equity/resources) (<https://www.usu.edu/equity/resources>).

Required Reporting of Sexual Misconduct and Threats of Harm

USU cares about our students and provides a number of resources and supportive measures to students who may be experiencing thoughts of self-harm or who have experienced sexual misconduct. To ensure students are informed about resources and services available to them, including available grievance or criminal processes for incidents of sexual misconduct, USU has implemented [reporting policies and practices](https://www.usu.edu/policies/340/) (<https://www.usu.edu/policies/340/>) that require designated employees to report any information they receive about incidents of sexual misconduct. This reporting policy also assists USU with its efforts to prevent sexual misconduct and keep our campus community safe.

Under USU's sexual misconduct reporting policy, I am designated as a "[reporting employee](https://www.usu.edu/equity/sexual-misconduct/employees.php)" (<https://www.usu.edu/equity/sexual-misconduct/employees.php>). This means that if you share information with me about incidents of [sexual misconduct](https://www.usu.edu/equity/sexual-misconduct/Sexual-Misconduct-Terms.php) (<https://www.usu.edu/equity/sexual-misconduct/Sexual-Misconduct-Terms.php>) (sexual harassment, sexual assault, relationship violence, or sex-based stalking), including within a course assignment, I *will report* that information to the [USU Title IX Coordinator](https://www.usu.edu/equity/sexual-misconduct/Title-IX-Coordinator.php) (<https://www.usu.edu/equity/sexual-misconduct/Title-IX-Coordinator.php>). I will also share with you information about [designated confidential resources](https://www.usu.edu/equity/sexual-misconduct/confidential-resources) (<https://www.usu.edu/equity/sexual-misconduct/confidential-resources>), [supportive measures](https://www.usu.edu/equity/Supportive-Measures.php) (<https://www.usu.edu/equity/Supportive-Measures.php>), and [how you can file a report](https://www.usu.edu/equity/report.php) (<https://www.usu.edu/equity/report.php>) with the USU Title IX Coordinator.

Self-disclosures about sexual misconduct that you experienced are not required for your course work.

Similarly, if you disclose thoughts of harm to self or a threat to others to me, including within a course assignment, I will report the information to the appropriate campus administrators. I will also share with you information about the [mental health and wellness resources](https://www.usu.edu/aggiwellness/caps/) (<https://www.usu.edu/aggiwellness/caps/>) available to you.

Withdrawal Policy and "I" Grade Policy

Students are required to complete all courses for which they are registered by the end of the semester. In some cases, a student may be unable to complete all of the coursework because of extenuating circumstances, but not due to poor performance or to retain financial aid. The term 'extenuating' circumstances includes: (1) incapacitating illness which prevents a student from attending classes for a minimum period of two weeks, (2) a death in the immediate family, (3) financial responsibilities requiring a student to alter a work schedule to secure employment, (4) change in work schedule as required by an employer, or (5) other emergencies deemed appropriate by the instructor.

Students with Disabilities

USU welcomes students with disabilities. If you have, or suspect you may have, a physical, mental health, or learning disability that may require accommodations in this course, please contact the [Disability Resource Center \(DRC\)](http://www.usu.edu/drc/) (<http://www.usu.edu/drc/>) as early in the semester as possible (University Inn # 101, (435) 797-2444, drc@usu.edu (<mailto:drc@usu.edu>)). All disability related accommodations must be approved by the DRC. Once approved, the DRC will coordinate with faculty to provide accommodations.

Students Who are Pregnant or Have a Pregnancy-Related Condition

If you need academic accommodations related to pregnancy, childbirth, false pregnancy, termination of pregnancy, recovery, or other pregnancy related conditions, please contact the Office of Equity as early as possible. All accommodations related to pregnancy must be approved by the Office of Equity. The Office of Equity will then coordinate with instructors to provide accommodations. The University will not exclude a student from participating in any part of an educational program based on the student's pregnancy or pregnancy related conditions.

Office of Equity: Distance Education, Room 400, Logan Campus, 435-797-1266, [Office of Equity: Pregnancy and Pregnancy Related Conditions \(https://www.usu.edu/equity/pregnancy-accommodations\)](https://www.usu.edu/equity/pregnancy-accommodations).

Inclusive Excellence

USU provides resources to help all students feel included as part of the campus and broader USU community. To learn more about the resources available and how to access them, visit the [Inclusive Excellence Office \(https://www.usu.edu/inclusive-excellence/\)](https://www.usu.edu/inclusive-excellence/).

Grievance Process

Students who feel they have been unfairly treated may file a grievance through the channels and procedures described in the [Academic Grievances](https://catalog.usu.edu/content.php?catoid=39&navoid=30452) section of the Course Catalog (<https://catalog.usu.edu/content.php?catoid=39&navoid=30452>).

Full details for USU Academic Policies and Procedures

- [Acceptable Use of University Computing Resources \(https://www.usu.edu/policies/550/\)](https://www.usu.edu/policies/550/)
- [Academic Policies and Practices \(USU Catalog\) \(https://catalog.usu.edu/content.php?catoid=39&navoid=29998\)](https://catalog.usu.edu/content.php?catoid=39&navoid=29998)
- [Student Conduct \(http://www.usu.edu/studentconduct\)](http://www.usu.edu/studentconduct)
- [Student Code \(https://www.usu.edu/student-conduct/student-code/\)](https://www.usu.edu/student-conduct/student-code/)
- [Academic Freedom and Professional Responsibility Policy \(https://www.usu.edu/policies/403/\)](https://catalog.usu.edu/content.php?catoid=38&navoid=28932)

Emergency Procedures

In the case of a drill or real emergency, classes will be notified to evacuate the building via USU official communication channels. Those channels will be: an audible alarm, such as a fire alarm; an Aggie Alert notification; or notification by a USU representative. In the event of a disaster that does not permit enough time for notifications, evacuate as the situation dictates (i.e., when shaking ceases in an earthquake; immediately when a fire is discovered or in the event of other immediate life safety concerns). If it does not inhibit safety, turn off computers and take any personal items with you. Elevators should not be used; instead, use the closest stairs. See [USU Emergency Management \(https://www.usu.edu/dps/emergency/\)](https://www.usu.edu/dps/emergency/) for more information.

General Health Protocols

The cold, flu, COVID-19, and other illnesses can have an impact on the health of our university community. USU welcomes the wearing of masks in all university buildings and encourages taking measures to mitigate risk as recommended by federal and state public health officials: getting vaccinated, staying home if you are sick, and frequent hand washing.

Mental Health

Mental health is critically important for the success of USU students. As a student, you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce your ability to participate in daily activities. Utah State

University provides free services for students to assist them with addressing these and other concerns. You can learn more about the broad range of confidential mental health services available on campus at [Counseling and Psychological Services \(CAPS\)](https://counseling.usu.edu) (<https://counseling.usu.edu>).

Students are also encouraged to download the "[SafeUT App](https://safeut.org/)" (<https://safeut.org/>) to their smartphones. The SafeUT application is a 24/7 statewide crisis text and tip service that provides real-time crisis intervention to students through texting and a confidential tip program that can help anyone with emotional crises, bullying, relationship problems, mental health, or suicide related issues.