CMPSC 201 – Principles of Programming Languages
Course Syllabus Fall 2018
Allegheny College

Course Instructor:
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Instructors Office Hours
- Monday, Tuesday, Wednesday, Thursday, and Friday: 11:00 am –12:00 pm (15 minute time slots)
- Friday: 1:30 pm –2:30 pm (15 minute time slots)

To schedule a meeting with me during my office hours, please visit my web site and click the Schedule link in the top right-hand corner. The google calendar page has an option to browse my office hours or schedule an appointment by clicking the correct link and then reserving an open time slot. Students are also encouraged to post appropriate questions to a channel in Slack, which is available at https://cmpsc201Spring2018.slack.com/, and monitored by the instructor and the teaching assistants.

Course Meeting Schedule
Lecture: Monday, Wednesday, and Friday, 10:00 am –10:50 am
Lab: Tuesday, 02:30 pm –04:20 pm

Course Description
A study of the important concepts in the design of programming languages, with emphasis on data types, scoping, binding times, control structures, facilities for abstraction, and storage allocation. Language constructs will be evaluated both for their usefulness in supporting the software development process and the overhead incurred in implementing them. Both procedural and non-procedural languages will be studied, and students will acquire enough literacy in a few of these languages to write moderately sophisticated programs. One laboratory session per week.

Prerequisites: Computer Science 101 officially (CMPSC100 is sufficient)

Required Texts and Materials
- Course Website: http://www.cs.allegheny.edu/amohan/teaching/cs201/
- Slack Channel: http://cs201f2018.slack.com
Course Objectives
This course will introduce students to the foundational concepts that underlie programming language syntax and semantics through a comparative study of several languages and their features. The main goal of the course is to equip students with the ability to study conceptual linguistic issues without having to focus on a particular languages implementation. The course will discuss key issues related to programming language design, such as the paradigm (procedural, functional, etc.), and implementation (interpreter, compiler, virtual machine, etc.). To facilitate learning these fundamental concepts, students will also gain hands-on experience through various assignments in different programming languages.

Learning Objectives
At the completion of this class, a student must be comfortable with the fundamental concepts that underly most programming languages. Students should be moderately experienced in using the different programming styles or paradigms and should be able to choose the appropriate programming languages for certain classes of problems. Finally, students must be able to develop and apply a strong knowledge of analytical and empirical programming techniques and be able to learn new programming languages with a minimum of effort based on an understanding of general principles of language design and implementation.

Teaching and Learning Methods
The main mode of learning in this class is following along with the posted course material and reading the accompanying sections in each textbook. Students are responsible for reading assigned portions of the textbook, whether or not the topics are discussed in the lectures. The instructor will ask questions to stimulate thinking and participation. Students comments and questions are highly encouraged via the course Slack channel. Internet resources will also be used to supplement lectures and discussions. The Lecture Structure and Lab Session Structure sections present in more detail the expectations and deliverables expected in each class session.

Lecture Structure
Lectures will consist of two primary formats: Standard Lectures and Q&A Lectures.

- Standard Lectures: A standard lecture session will have the following format:
  1. Listening to lectures.
  2. Exploring and enhancing provided code.
  3. Attempting practice problems and/or interacting with non-code sample material.

- A 5-minute Review Form will be provided, to help the instructor understand how you have followed the course material for the current session and if any of the content was unclear. The Review form will be provided once a week, through an online platform. It is highly recommended to complete the review forms and provide necessary feedback to the instructor.

- Q&A Lectures: A Q&A lecture session will have the following format:
  1. A Q&A lecture session will be scheduled once in two to three weeks. During the class session, a flexible time interval is set for discussion based on questions to be discussed.
  2. During the session, the instructor brainstorm with the students and steer discussions towards answering the questions that have been submitted in advance of the scheduled lecture. The instructor may call up students randomly, to participate in the discussion.

  - A 5-minute Review Form will be provided, to help the instructor understand how you have followed the course material for the current session and if any of the content was unclear. The Review form will be provided at the end of the Q&A session, through an online platform.

Lab Session Structure
A laboratory session will include the following components:

- A 10-minute Lab walk through, where the lab specification will be discussed in detail.
- A 100-minute in-depth exploration of some topic(s) from recent course material, due the following week and graded for Lab credit.

Grading and Evaluation
The grading and evaluation process is very transparent and any time during the semester students can monitor their
progress by looking at the grade book. The total grade for the course will be based on the following, weighted appropriately:

- Exam 1 (10%)
- Exam 2 (10%)
- Final Exam (20%)
- Lab Assignments (30%)
- Quizzes (20%)
- Class Participation (10%)

A more detailed breakdown of the expectations for grades in the course is as follows:

- **Exams:** Three exams will be given in this class, spaced roughly five weeks apart. The final will be cumulative, as later parts of the course will build on your knowledge from previous weeks. Raw grades for the exams are based on the accuracy and merit of the content. In addition, the grades for the exams will be affected negatively if the quality of language use or the mechanics of the calculations undermine the overall logic and credibility of the content. There will be a grade book administered by the course instructor and all the graded activities will be logged in the grade book. The grade book would be made accessible to the students who are registered in the course. If a student finds any grading discrepancy, it should be immediately discussed with the Instructor within a week from the time that the graded work was returned back.

- **Lab Assignments:** This course contains a weekly laboratory session, where students will investigate some of the topics that are noted in the textbooks and lecture in more detail. This investigation will take the form of solving one or more coding challenges, answering one or more problems prompted by the textbook, and/or a guided walkthrough of a new concept. See the **Assignment Submission and Late Policy** section of this syllabus for details about the course Late Policy.

- **Quizzes:** Once in two to three weeks, an online/paper quiz will be administered that serves to test your knowledge on some of the fundamental topics discussed in the lecture materials and in the textbooks. The questions can be either strictly multiple choice or a combination of multiple choice and descriptive questions.

- **Class Participation:** Students are expected to attend lecture and laboratory sessions in the classroom at the stated class time. Interaction with the professor and your classmates is important in any Allegheny course. Students will be expected to join discussions on the course Slack channel, attend office hours with the instructor, and providing feedback on the pace and content of the course to the instructor.

**Assignment Submission and Late Policy**
Every assignment has a due date and time. Failure to hand in the assignment by the deadline will result in a late submission penalty.

Assignments handed in within one week of the deadline will receive automatic grade reductions of 20% (in addition to any points deducted for errors). Assignments will not be accepted more than one week past the deadline, unless you can provide documented extenuating circumstances. Any extenuating circumstances must be documented through the Learning Commons, Counseling Center, Dean of Students office, Health Center, or other authoritative source.

If you are unable to attend class or lab for any reason beyond illness or injury, you must make arrangements with the course instructor to turn in assignments before class. Exams must be taken at scheduled times. This includes the final exam. Please check the syllabus and with the instructor one week before making any travel plans for the end of the semester or around breaks. Missed exams will receive a grade of zero without a documented illness or emergency.

**Disability Statement**
Students with disabilities who believe they may need accommodations in this class are encouraged to contact Student Disability Services (SDS) at (814) 332-2898. SDS is part of the Learning Commons and is located in Pelletier Library. Please do this as soon as possible to ensure that such accommodations are implemented in a timely fashion.

**Email and Slack**
The instructor will primarily be checking the course Slack channel and his allegheny email account on regular basis. In general, you can expect the instructor to reply to your email messages during week days. Students who are struggling with the course material or who have question should begin by posting their question
(unless a private concern) to the Slack channel, so that the instructor or a fellow student can provide an answer within the bounds of the Honor Code.

Class Preparation
In order to minimize confusion and maximize learning, students must invest time to prepare for the class discussions and lectures. During the class periods, the course instructor will often pose demanding questions that could require group discussion, the creation of a program or data set, a vote on a thought-provoking issue, or a group presentation. Only students who have prepared for class by reading the assigned material and reviewing the current assignments will be able to effectively participate in these discussions. More importantly, only prepared students will be able to acquire the knowledge and skills that are needed to be successful in both this course and the field of computer science.

In order to help students remain organized and effectively prepare for classes, the course instructor will maintain a class schedule with reading assignments and presentation slides. During the class sessions, students will also be required to download, use, and modify programs and data sets that are made available through the course website.

Honor Code
All students enrolled at Allegheny College are bound by the Honor Code. It is expected that your behavior will reflect that commitment. To this end, we expect that you will adhere to the following Department Policy:

Department of Computer Science Honor Code Policy

It is recognized that an important part of the learning process in any course, and particularly in computer science, derives from thoughtful discussions with teachers, student assistants, and fellow students. Such dialogue is encouraged. However, it is necessary to distinguish carefully between the student who discusses the principles underlying a problem with others, and the student who produces assignments that are identical to, or merely variations on, someone else's work. It will therefore be understood that all assignments submitted to faculty of the Department of Computer Science are to be the original work of the student submitting the assignment, and should be signed in accordance with the provisions of the Honor Code. Appropriate action will be taken when assignments give evidence that they were derived from the work of others.

You are encouraged to periodically review the specifics of the Honor Code as stated in the College Catalogue, The Compass, and elsewhere.

Additionally, the Honor Committee co-chairs have requested that a signature as well as the following phrasing be included on all submissions of graded work:

"This work is mine unless otherwise cited."

Structure of the Semester
In Table 1 displayed on next page, a rough outline of the topics covered this semester is provided. Some shifting in the schedule of topics is possible, but the exam dates are firm (probably).
<table>
<thead>
<tr>
<th>Week</th>
<th>Date</th>
<th>Topics/Readings</th>
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<tbody>
<tr>
<td>1</td>
<td>29 Aug - 4 Sep</td>
<td>Introduction; Compilation and Interpretation (PLP 1)</td>
</tr>
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<td>2</td>
<td>5 - 11 Sep</td>
<td>Analysis, Scope, and Binding (PLP 3)</td>
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<td>3</td>
<td>12 - 18 Sep</td>
<td>Scope, Control Flow (PLP 6)</td>
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<td>4</td>
<td>19 - 25 Sep</td>
<td>Control Flow, Data Types (PLP 7)</td>
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<td>5</td>
<td>26 - 2 Oct</td>
<td>Data Types (PLP 8)</td>
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<td><strong>FIRST EXAM:</strong></td>
<td><strong>Tue 2 Oct, during lab timings</strong></td>
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<tr>
<td>6</td>
<td>3 - 9 Oct</td>
<td>Subroutines (PLP 8)</td>
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<td><strong>Fall break:</strong></td>
<td><strong>6 - 9 Oct</strong></td>
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<td>7</td>
<td>10 - 16 Oct</td>
<td>Object Oriented Programming (PH 9)</td>
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<td>8</td>
<td>17 - 23 Oct</td>
<td>Functional Programming (PLP 10)</td>
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<td>9</td>
<td>24 - 30 Oct</td>
<td>Logic Programming (PLP 11)</td>
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<td>10</td>
<td>31 Oct - 6 Nov</td>
<td>Logic Programming Continuation (PLP 11)</td>
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<td>11</td>
<td>7 - 13 Nov</td>
<td>Scripting Languages (PLP 13)</td>
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<td>12</td>
<td>14 - 20 Nov</td>
<td>Scripting Languages Continuation (PLP 13)</td>
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<td><strong>SECOND EXAM:</strong></td>
<td><strong>Thu 20 Nov, during lab timings</strong></td>
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<td>13</td>
<td>21 - 27 Nov</td>
<td>Advanced Topics</td>
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<td><strong>Thanks Giving break:</strong></td>
<td><strong>21 - 25 Nov</strong></td>
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<td>14</td>
<td>28 Nov - 4 Dec</td>
<td>Advanced Topics</td>
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<td>15</td>
<td>5 - 11 Dec</td>
<td>Advanced Topics</td>
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<td><strong>LAST DAY of classes:</strong></td>
<td><strong>Mon 10 Dec</strong></td>
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<td><strong>FINAL EXAM:</strong></td>
<td><strong>Mon 10 Dec</strong></td>
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<td><strong>FINAL EXAM:</strong></td>
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<td><strong>17 Dec, 9 a.m.</strong></td>
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Table 1: Tentative Schedule for CMPSC 201 Lecture Session, Fall 2018