CS105 – Elementary Programming

Professor

Lewis Barnett  Jepson Hall, 212A
(804) 289-8091
lbarnett@richmond.edu

Office hours: 1:30pm - 2:30pm MW, 9:30am - 10:30am TTH, or by appointment

Prerequisites

None.

Course Description

From start to finish, this course is about writing computer programs to solve problems. Even so, no programming background is assumed – we will be starting from scratch in this course. The problems we will solve will be problems of animating scenes in a three-dimensional computer world. This work will be similar in some respects to what animators for computer-generated movies or programmers for video games do. Alice, the programming system we will be using, gives you control of the objects in the scene, lighting, camera position, and interaction with the user. Building up more complex interactions among the objects in your world and the user will require more and more sophisticated programming techniques. You will find that later material builds on earlier material, making it very important to keep up with what is going on in class. To help you develop a mental model of what is happening when your programs run, we will study basic computer organization, and to give you a feel for what computers are capable of, we will look at some theoretical limitations on what can be accomplished computationally. When the semester ends, you won’t exactly be ready to be an animator for Pixar Studios, but you should have a better appreciation for the complexity of the work that they do.

Symbolic Reasoning - Statement of Course Objective

(This is a detailed statement on how CMSC 105 satisfies the Fields of Study: Symbolic Reasoning requirement.) Students will solve problems using one or more programming systems. The problem solving will include translating problems into computer programs from problem statements that do not make clear the particular solution method to be used. In addition, the course will cover relevant background information, such as the rudiments of computer architecture and other aspects of the nature of computing systems and of computer science. This background will also include programming language syntax and semantics, so that students can recognize and correct syntax errors and can precisely predict the output of the kind of programs they write, given specified inputs. However, the central theme of the course will be the kind of problem solving by students that expresses a solution in the form of a computer program.
Readings


Computer Equipment

The computers we will use this semester are located in rooms G25 and G30 on the ground floor of Jepson Hall. These rooms will be reserved for use by lab sections of other Computer Science courses at some times, and are reserved for students doing math or computer science work at all times. Please use these computers only for your CS 105 work and move to the general-use laboratories for work required by other departments. A CD containing the software we will be using is included in your textbook, so you will be able to use your own computer to work on your assignments if you would like.

Attendance

Each unexcused absence will result in a 1 point deduction from your final average. Excuses need not be written. When possible, please inform me of absences beforehand.

Grading Policy

<table>
<thead>
<tr>
<th>Component</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Homework</td>
<td>10%</td>
</tr>
<tr>
<td>Projects</td>
<td>25%</td>
</tr>
<tr>
<td>Tests (3)</td>
<td>40%</td>
</tr>
<tr>
<td>Final (cumulative)</td>
<td>25%</td>
</tr>
</tbody>
</table>

Grades will be assigned on a 10 point scale. Makeup tests will not be given; in the event that a test is missed, the final exam grade will be substituted for the missed test in calculating the final grade for the course. Missed homework and project assignments will receive a grade of 0.

Assignments

There will be a number of homework problem sets (approximately one per week) which will be graded and returned. There will also be several larger programming projects. Late assignments will not be accepted.

The Honor Code

All tests and programming projects will be pledged under the honor code, unless the assignment explicitly states otherwise. Homework assignments are not pledged. If you are so inclined, feel free to work on the homework assignments in small groups. However, when you write up the problem set, please use your own words. Two people making longhand copies of one person's work is not acceptable.
Course Outline

I plan to cover the following topics this semester. The ordering may be rearranged somewhat. Tests will be scheduled approximately every seventh class meeting.

- Introduction to the Alice programming environment
- The basic structure of computers
- Constructing 3-D worlds
- Simple sequential animation
- Concurrency in animation
- Capturing animation sequences as named methods
- Interacting with the world
- Conditional execution
- Repetition – Looping
- Repetition – Recursion
- Collections of objects

- Limitations of computation
- Introduction to Java

Preliminary test dates – subject to change (except Final Exam)
- Test 1: Tuesday, September 19
- Test 2: Thursday, October 12
- Test 3: Thursday, November 9
- Final exam: Friday, Dec. 15, 2:00pm – 5:00 pm

Note that the final exam date and time is determined by the Registrar’s office and will not change. Please take this into account when you make your holiday travel plans.