CS123 Syllabus

Introduction to Computer Graphics, Fall 2015

http://cs.brown.edu/courses/cs123

cs123tas@cs.brown.edu

1 Welcome

Welcome to CS123, the longest running computer graphics course in the known universe! This short document will get you started with the course. For specifics, please also read through the CS123 Student Guide (http://cs.brown.edu/courses/cs123/docs/student_guide.pdf).

2 Staff / Info

- Professor: Andries van Dam (avd@cs.brown.edu)
- Head TA: Michael Murphy (mjm9@cs.brown.edu)
- UTAs: Carl Olsson (colsson), David Whitney (dwhitney), Jake Rosenfeld (jr51), Justin Bisignano (jtbisign), Lucas Pribe (lpribe), Vivian Morgowicz (vmorgowi), and Xiaoyi Mao (xmiao).
- Lectures: Tuesday/Thursday 10:30-11:50 AM, Lubrano (CIT 477)
- Labs: Thursday 8:30-10:30 PM and Friday 4:00-6:00 PM in the SunLab (CIT 143)

3 Prerequisites

The official prerequisites for CS123 are CS15/16, CS17/18, or CS19. CS33, because it uses C, is very helpful but not strictly required. CS32, for its software design, is additionally helpful but not required. Some familiarity with C++ will be helpful, but help sessions and extra support will be offered to students who don’t have any prior C++ experience. Some knowledge of linear algebra may also be helpful, but none is required or assumed.

4 Topics

The full list of lecture topics can be found on the lectures page of the website (http://cs.brown.edu/courses/cs123/lectures.html). These topics include:

- **OpenGL**: Industry standard graphics library used to produce real-time 2D and 3D graphics.
- **3D geometry**: Different ways 3D shapes can be represented in graphics applications.
- **Image processing**: How to process images by applying filters and transformations while avoiding artifacts like aliasing.
- **Viewing 3D scenes**: How to create a virtual camera that converts a 3D scene to a 2D image using linear algebra.
- **Illumination**: Mathematical models that can be used to calculate the amount of light reflected from an object in a scene.
- **Ray tracing**: A rendering method that is used to produce realistic images with reflections, refraction, and other effects.
- **Color theory**: Different ways to think about and represent colors.
- **Stochastic rendering methods**: Different strategies for rendering 3D scenes that use probabilistic models to simulate physical processes.
- **User interfaces**: Theory behind creating user interfaces for different form factors.
5 Assignment Structure

Your CS123 grade consists of 7 rigorously graded projects, 10 labs that are given completion grades, and a final project that is graded according to your presentation to the class during finals period:

- **Brush** (Due 9/70, weight 7%)
- **Shapes** (Due 9/30, weight 11%)
- **Filter** (Due 10/15, weight 15%)
- **Sceneview** (Due 10/28, weight 9%)
- **Intersect** (Due 11/12, weight 15%)
- **Ray** (Due 12/3, weight 13%)
- **Final** (Presentation date TBA, weight 20%)
- **10 Labs** (Due one week after lab period, total weight 10%)

Each of the 7 programming projects has an accompanying “algo” assignment which is due the Sunday after the assignment is released. These are worth approximately 10% of the grade for that project.

6 Materials

The primary text for this course is the new edition of Computer Graphics: Principles and Practice, by John Hughes, Andy van Dam, Morgan McGuire, David Sklar, Jim Foley, Steve Feiner, and Kurt Akeley. The book was recently published and is currently available at Amazon.com.

The lecture slides for CS123 are nearly comprehensive. They do not replace the textbook, but they are the best source of information that is directly relevant to the assignments.

The course website has a wealth of information that will be useful to you throughout the semester:

- Handouts that will get you started on each project
  (http://cs.brown.edu/courses/cs123/projects.html)
- Handouts that will get you started on each lab
  (http://cs.brown.edu/courses/cs123/labs.html)
- Links to PDF and PowerPoint versions of each lecture as well as accompanying videos and/or demos
  (http://cs.brown.edu/courses/cs123/lectures.html)
- Documentation for the support code, help session slides, and links to external sources for help with OpenGL
  (http://cs.brown.edu/courses/cs123/docs.html)
- TA hours schedule and contact information (http://cs.brown.edu/courses/cs123/staff.html)

7 Collaboration Policy

CS123 has a collaboration policy (http://cs.brown.edu/courses/cs123/docs/collaboration.pdf) that is a little bit different from other courses in the department. Please read it carefully, sign it, and place it in the CS123 handin bin on the 2nd floor.

8 Half-Credit Course

Students can also register for CSCI-1234 and complete specific additional assignments for each project to earn an extra half-credit. This course can be used to get grad credit, and it can also count as a capstone course. More details can be found in the student half-credit guide found in the docs section of the course website.
9 Late Policy

A late algo or lab checkoff will receive no credit. A project turned in up to 3 days late will be penalized by 15%, with an additional 10% penalty for every day late after 3. Every student has two late passes that can be used to waive the 15% deduction on a project. These late passes will automatically be applied optimally (to maximize your grade) at the end of the semester.

In exceptional circumstances, a doctor’s or dean’s note may allow for an additional extension or late pass. These will be handled on a case by case basis.