Computational Thinking
CS6604
Fall, 2013

Syllabus

Organizer
Dr. Dennis Kafura
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Meeting Time and Place
Tuesday/Thursday
5:15PM-6:30PM
Room 1110
KnowledgeWorks II
2202 Kraft Drive

Web Site
www.cs.vt.edu/~kafura/CS6604

Goals and Organization
The goal of this course is to develop a better understanding of what computational thinking means at the university level of teaching and learning, and how computational thinking could be made accessible to students in all disciplines at Virginia Tech.

The participants in the course will read, present, and discuss papers on computational thinking. It is expected that the reading is done in advance of the class, the presentation is a summary of key ideas, and the discussion is one in which all are actively engaged. The papers and presentation materials along with the schedule for presentation will be available on the class web site.

The course is organized into three areas:

- **model**: develop a vision of computational thinking at the university level by articulating a conceptual model of the elements of computational thinking and identifying the knowledge, skills, and dispositions that characterize a student with a mature computational thinking ability,

- **pedagogy**: generate ideas on how the model can be incorporated into a university curriculum through a variety of means: as a single course of study open to students of all disciplines, as a progression of learning experiences within a specific discipline, or a specific module that embodies a key aspect of computational thinking, and

- **assessment**: formulate quantitative or qualitative measures related to the computational thinking model that indicate a student’s capability to engage in computational thinking or their mastery of a particular aspect of computational thinking.
Requirements

Students taking the course for credit are expected to:

• read all assigned papers and be an active participant in the discussion of these papers,
• present a topic in class based on one or more papers, and
• write a term paper.

The term paper consists of three sections corresponding to the three topic areas: model, pedagogy, and assessment. Each section is three to five pages in length and should be labeled as either:

• summary: a well organized, integrated, and well articulated summary of the discussion of the topic area. For example, the model section might be a clear presentation of the key elements of what computational thinking means at the university level.

• proposal: the presentation of an interesting and compelling idea related to the topic area. For example, the pedagogy section might be a description of a stand-alone computational thinking class or the assessment section may be a set of measurements.

Not all three sections can be of the summary form.

A due date during the semester will be given for the first two sections. The due dates will be shortly after the corresponding topic has been covered in the class. Feedback on the first two sections will be given to allow rewriting for the final version of the term paper. It will not be possible to provide separate feedback on the third section.

The complete term paper is due on Tuesday, December 17, 2013.

Grading

The final grade will be based on the quality of the term paper, the quality of the class presentation, and the instructor’s subjective evaluation of the student’s class participation throughout the semester.