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Faculty Learning Community
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Introduction

It was good to meet and work with other adjunct faculty members. We were able to share our frustrations and incites. Lack of any sort of structured adjunct teaching preparation is endemic at RIT. Adjuncts are hired and tossed into the pool without as much as an instructional video on the dog paddle.

The Faculty Learning Community (FLC) was my first foray into any systematic approach to teaching. Due to the short timeframe for the summer FLC I will only tackle one aspect of my class. The project I plan to address is active learning and the specific course area is computer cache basics.

Philosophy of Teaching

The role of the professor in the class is to expose students to the truth and help the student grow in knowledge of the subject area. The most important truths are the fundamentals. Specific technology changes over time but the fundamentals always remain.

Teaching Metaphor: Gardening

Teaching to me is like being a gardener, with students as the seeds. The gardener takes the seeds and carefully places them in a nurturing environment. He exposes the seeds to the warmth of the sun, provides water and looks over them to make sure no pests are interfering with growth.

The type of seeds might change over time and the environment might get warmer or dryer but the fundamentals of gardening always remain. Some seeds will do better than other in a given environment but a good gardener will try new things to maximize the yield from this crop.

Summary of FLC Project

Problem:

In ECE 0306-340-01 “Engineering Fundamentals of Computer Systems” much of the material is dry, basic computer fact with little opportunity to get the students involved in a more active learning experience.

One of the key concepts in the class is computer cache technology but it is currently presented mostly in a lecture format and student focus tends to fall off after about 15 minutes. As a result of this fall off the students don’t get the chance to internalize the concepts and the students revert to wrote memorization.

My goal is to take the current material and make it active by using students as the central processor, cache and main memory elements. Students will be able to see and internalize the steps, benefits and limitations of a computer cache. I hope it will be fun and keep the students involved.

Syllabus:

Course: 0306-340-01 Engineering Fundamentals of Computer Systems (Class 4, Credit 4)
Class/Lab Schedule: Two 2-hour lectures per week, 5 min break

Course Description:
This course introduces the computer engineering fundamentals upon which current computer systems are based. Discussion of the machine level representation of data, Boolean algebra and simple logic circuits describes the hardware foundations for modern computer systems. An introduction to instruction set design and assembly language provides the student with an understanding of the interface between hardware and software. The course concludes by discussing caching, virtual memory, IO, storage, compression, and embedded systems.

Prerequisites: Prerequisites: 4003 233 (Computer Science 3; Computing and Information Science→Computer Science) and 1016 265 (Discrete Math; Science→Mathematics and Statistics), for non-computer engineering majors

Textbooks and/or Required Materials:

- L. Null and J. Lobur, The Essentials of Computer Organization and Architecture, Second Edition, Jones and Bartlett Publishers, Inc., 2006 (ISBN 0-7637-3769-0). On-line material posted to myCourses.

Grading:

Tests (2 @ 20% each)	40%
Homework (6@ 6% each)	36%
Final Exam	20%
Class Participation	4%
Total	100%

Final Grades:
Curve applied, logical groupings/clustering of students.

Tests:
Test #1, 2: May bring single sided hand written 8.5x11 sheet of paper with notes, No calculators or cell phones. Optional review will be held before the tests.
Final exam: Single sheet, 1 or 2 sided, hand written 8.5x11 sheet of notes, non-programmable calculator that cannot do base conversions allowed, no cell phones.

Proposed Solution:

I want to involve students in the processor/cache/memory interface so the can literally "see" how the system works. I will setup a few "program" streams to illustrate how a cache can help or hurt.

One student will be the CPU and will "execute" the program by calling out the "memory address" (number). Another student, physically close to the CPU, will be the cache and will have to look through their collection of entries for the "address" and return it to the CPU if they have it or request the "address" from "main memory".

Main memory will be a series of students, each responsible for a selected range of addresses and they will be FORCED to walk from the back of the room to the front to hand the "data" to the cache and then return to the back of the room.

Articles:

http://www-cs.canisius.edu/~mcconnel/Papers/sigcse_sigcue.html
https://ritdml.rit.edu/dspace/bitstream/1850/6273/3/JKangPortfolio2008.pdf

Assessment Plan:

I will give a myCourses survey and ask the class what they felt about the technique and what they feel their level of understanding of the material is.

I will also use my own observation of the class and the quality of the answers on the test to determine the understanding level and compare it with my memory of previous classes.

Time Line:

My ECE 0306-340-01 "Engineering Fundamentals of Computer Systems" will not be offered again until winter quarter so I will not be able to conduct my experiment until then.

The active cache class will require some preparation and at least one dry run before I conduct it with the class. I will need to structure the "program" to illustrate the issues and create some props to force "data" hand offs.

Reflections:

It felt good to see that my issues and concerns were shared by the other adjunct faculty. It was also good to get access to post secondary teaching resources. I need to continue to read and explore teaching ideas, try them in my class and measure the results. I hope that the other adjuncts and I can keep in touch and continue to help each other.