GAM 376: Artificial Intelligence in Computer Games
Professor Robin Burke
Winter 2006, Section 501, Rm CS&T 214
M/W 1:30 – 3:00 pm

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Description
Artificial Intelligence (AI) is one of the essential components of a computer game. The course introduces basic concepts of AI in the gaming context such as finite state machines, fuzzy logic, subsumption architectures, planning and search. Emphasis will be placed on applications of AI in various genres of computer games. Students will work with implementations of common game AI algorithms for behaviors such as pathfinding, and behavior selection.

Prerequisites
CSC 262 or CSC 309

Course Text
On-line materials as assigned.

Resources
Students in the class will have access to the CTI Computer Game Development Lab (CS&T 722) for programming assignments. We will be using Visual Studio 2003 for our C++ work and there will also be a class project using HL 2 SDK.

Web Site
The course web site will be an important resource for all aspects of the course:
http://josquin.cti.depaul.edu/~rburke/courses/w06/gam376/
The schedule and other syllabus information may change during the quarter: the web site will contain the most up-to-date information.

Organization and Assessment
GAM 376 will meet once a week. Generally, we will use class time for lectures and discussion. There will be a number of scheduled lab sessions during the quarter. Participation will be extremely important. Students are expected to attend all classes, do the assigned reading and homework before class time.

Student progress will be assessed through programming projects, a final project, a midterm, and class participation.

- Final Project – 25%
- Midterm – 20%
- Individual Programming Projects (3) – 15%
- Group Programming Projects (2) – 20%
- Participation / Labs – 20%
Programming Projects
There will be three individual and two group programming projects. Members of the group programming teams will be assigned by the instructor. On the due date for the group projects, we will holding tournaments in which the programs developed by each team will compete against each other.

Final Project
The final project will be a group project creating a Half-Life 2 mod. Students will work in teams of 3-4 and meet several intermediate milestones before the final deliverable on 3/17.

Tentative Class Schedule

1/4: Introduction to the course. Discussion of syllabus, grading and requirements. AI and Game AI. Basic physics and math.
Lab: Visit to the game development lab.
Reading: Buckland, Ch. 1.

1/11: Finite State Machines. Uses and applicability of FSMs in games. FSM implementations and design choices. Extensions.
Lab: Half-Life 2: My First Mod
Reading: Buckland, Ch. 2
Due: Homework #1
Project: Team formation

1/18: Steering behaviors. Flocking, following, obstacle avoidance and other steering behaviors. Managing groups of agents. Spatial partitioning.
Lab: Steering behaviors
Reading: Buckland, Ch. 3
Due: Homework #2

Lab: Simple soccer
Reading: Buckland, Ch. 4 and 5 (up to pg. 209)
Due: Homework #3

Reading: Buckland, Ch. 5 (from pg. 209) and Ch. 6
Project: Build 1

2/8: Midterm
Lab: Project work

2/15: Lab: Soccer tournament and Raven. An agent-based AI example.
Reading: Buckland, Ch. 7
Due: Soccer team

Lab: Path finding
Reading: Buckland, Ch. 8
Project: Build 2

Lab: Raven tournament
Reading: Buckland, Ch. 9
Due: Raven bot

Lab: Project work

3/17: Final project demos
Due: Final project implementation

**Policies**

Students are expected to attend all classes and participate in in-class exercises. Class will start promptly. Students are individually responsible for material they may have missed due to absence or tardiness.

Most assignments will be submitted to the Course On-Line site. Do not submit assignments by email. Late assignments will not be accepted without written permission of the instructor. The Soccer and Raven assignments cannot be accepted late.

Assignments (except for designated group assignments) must represent a student's individual effort. While students are permitted to discuss assignments at the conceptual level, under no circumstances should students share specific answers (electronically or otherwise).

**School Policies**

**Online Instructor Evaluation**
Course and instructor evaluations are critical for maintaining and improving course quality. To make evaluations as meaningful as possible, we need 100% student participation. Therefore, participation in the School’s web-based academic administration initiative during the eighth and ninth week of this course is a requirement of this course. Failure to participate in this process will result in a grade of incomplete for the course. This incomplete will be automatically removed within seven weeks after the end of the course and replaced by the grade you would have received if you had fulfilled this requirement.

**Email**
Email is the primary means of communication between faculty and students enrolled in this course outside of class time. Students should be sure their email listed under "demographic information" at http://campusconnect.depaul.edu/ is correct.

**Plagiarism:**
The university and school policy on plagiarism can be summarized as follows: Students in this course, as well as all other courses in which independent research or writing play a vital part in the course requirements, should be aware of the strong sanctions that can be imposed against someone guilty of plagiarism. If proven, a charge of plagiarism could result in an automatic F in the course and possible expulsion. The strongest of sanctions will be imposed on anyone who submits as his/her own work a report, examination paper, computer file, lab report, or other assignment which has been prepared by someone else. If you have any questions or doubts about what plagiarism entails or how to properly acknowledge source materials be sure to consult the instructor.

**Incomplete:**
An incomplete grade is given only for an exceptional reason such as a death in the family, a serious illness, etc. Any such reason must be documented. Any incomplete request must be made at least two weeks before the final, and approved by the Dean of the School of Computer Science, Telecommunications and Information Systems. Any consequences resulting from a poor grade for the course will not be considered as valid reasons for such a request.