

# CSE 5322/4361 SOFTWARE DESIGN PATTERNS

## FALL 2006

### 1 General

Lectures: TR 2:00pm-3:20pm 108 WH  
Instructor: David C. Kung, 332 NH, 817-272-three 627  
Email: kung at uta dot edu, Fax: 817-272-3784  
Office Hours: 3:30pm-4:30pm TR, or by appointment  
GTA: TBA, Office: TBA, Office Hours: TBA

### 2 Course Objective

5322. SOFTWARE DESIGN PATTERNS (3-0). Study and application of object-oriented software design patterns to software development in the object-oriented paradigm. Prerequisite: CSE 5324.

### 3 Textbook

E. Gamma, et al. "Design Patterns: Elements of Reusable Object-Oriented Software," Addison-Wesley, 1995.

### 4 Reference Books and Articles

Craig Larman, "Applying UML and Patterns," Prentice Hall, 2001.

### 5 Tentative Schedule

- Lecture 1. Introduction and Motivation Motivating examples
  - What is a design pattern?
  - What is not a design pattern?
  - Describing design patterns
  - Usefulness of design patterns
  - Design patterns to be covered
  - Brief history of design patterns
- Lecture 2. The unified process Why review the unified process (UP)?
  - UP and UML through examples

Team project requirements and deliverables

- Lecture 3. Applying GRASP patterns in the UP the controller pattern  
the expert pattern  
the creator patter
- Lectures 4-6. Learning Gang of Four through a case study
- Lecture 7. Other Gang of Four Patterns
- Lecture 8. Other GRASP patterns
- Lecture 9. Related topics Frameworks, patterns and persistence  
What is a framework  
The Template Method Pattern revisited  
An object persistence framework  
Frameworks, patterns and architectural style  
Research in design patterns

## 6 Workload

1 team project 50%. Requires the students to apply at least 10 patterns. The project weight includes 3 team member peer evaluation, 1% each submission, submitted at the end of each increment. Team member peer evaluation will affect your score, the deduction may range widely from 5% to 80%.

2 individual homework assignments, 15% each.

1 midterm exam 20%, may be waived for teams that perform excellent project work.

## 7 Grade Distribution

Total Score	$\geq 85$	$\geq 70$	$\geq 60$	$\geq 50$	$< 50$
Grade	A	B	C	D	F

The grades are computed by a program according to your scores. If you get 84.95 then you will get a “B”, not an “A” even if the score is so close to 85.

## 8 General Grading Criteria

### Individual Assignments:

- 1) Correctness – the solution adequately solves the given problem
- 2) Soundness – the solution is well justified

- 3) Efficiency – the solution is among the simplest ones possible
- 4) Organization – the presentation of the solution is easy to understand and logically organized
- 5) Clarity – the solution is clearly stated and tables and figures are professionally produced
- 6) Grammar, spelling, and writing – correct grammar and spelling, and legible writing

1) – 2) are worth about 60% of the weight and 3) - 6) about 40%.

### **Team Project:**

- 1) Requirements – identification, formulation and presentation of the requirements, evaluated in terms of completeness, consistency, validity and understandability. 15 %
- 2) Design – fulfillment of the requirements, software design considerations, user interface design and component interface design, evaluated in terms of completeness, consistency, validity, user-friendly, effectiveness and efficiency. 15 %
- 3) Implementation – evaluated in terms of correctness, efficiency, and coding style. 15 %
- 4) Teamwork – teamwork spirit, evaluated in terms of cooperativeness, enthusiasm and unity. 15 %
- 5) Documentation – professionally produced reports and models, evaluated in terms of report organization, completeness of standard report items, art work, expression and spelling. 15 %
- 6) Oral presentation – evaluated in terms of informativeness to the audience, well-organized and well-prepared slides and dynamic oral communication skills. Make sure that your demo will work in the classroom rather than in the lab. 15 %
- 7) Oral presentation attendance – timely attending all the presentations and actively participating in the discussions (such as asking questions, making remarks, etc.) are an important part of the course project. Each absence (without prior permission) will result in 10 % deduction for the part of the project work. You can request only one or two permissions for the whole semester.

## **9 Assignment Rules**

1. Late assignments will be accepted before the explanation of the homework assignment in class. Late assignment are subjected to 10% deduction and additional 10% deduction for every 24 hours passing the deadline. After the explanation, no assignment will be accepted. This rule will be consistently applied to every student in all cases, regardless whatever good reason you may have.
2. You are encouraged to discuss homework with your classmates but not allowed to copy the solutions from or share the solutions with anybody. If you violate this rule, then you will receive no credit for that assignment unless you can prove that you are not involved.
3. The GTA will do most of the grading. If you do not agree with the result, contact the GTA first. Please contact the instructor if you cannot reach a consensus. This would help the GTA improve her/his grading skill and avoid inconsistency due to improper interference of the instructor.
4. To be fair to the other students, no special assignment will be provided for any student to improve her/his grade.

## **10 Email Project Team Information**

If the course has a team project, please email the following to the TA and the instructor by the deadline (the deadline is one day after the census date):

Team project (with 1 – 3 priorities) and team leader and team member names, email addresses and phone numbers in the following format:

Team leader  
member name, email, phone number

## **11 Team Member Evaluation Form**

1% for each evaluation to be submitted.

Enclosed at the end of this syllabus is a team member evaluation form which must be submitted by every team member after each increment. The form is also available from the course ftp site.

Use this form to appraise those team members that you feel their contributions should be credited and provide the instructor information about team members who need improvement. I will keep this confidential.

## **12 Class Email Alias**

I will broadcast important messages, homework assignments, project descriptions etc. to students of the class. The messages will be delivered to your omega account. If you do not receive such messages, please contact me immediately so that I can add you to the list. It is your responsibility to contact me when your omega account has changed.

## **13 Your Standing and Class Statistics**

After each assignment or test has been graded, I will distribute to each of you your scores and grade up to that assignment or test. You will also receive class performance statistics. Timely distribution of such information requires that the TA email me the scores in time. Please help me to remind the TA to email me such information.

## **14 ABET Stuff**

The following ABET stuff is related to the CSE4361 section only and is required by the Undergraduate Studies Committee to inform the students what will be individually assessed and how. For this course, the outcomes will be assessed by the individual assignments/tests. Students must

pass all the individual assignments and tests to pass this course. For materials relating to ethics and professional practice, see the next section.

The following highlighted program outcomes will be individually assessed in this course:

*PO1. Achieve proficiency in several education areas through knowledge of fundamentals of mathematics, basic science, and computing systems and science.*

*PO2. Possess the skills to analyze complex computing systems, design solutions and engineer these solutions using computer software tools and technologies.*

PO3. Be able to effectively communicate both orally and in writing.

*PO4. Have the ability to practice software engineering in industry-like situations and appreciate the need for ethical and professional behavior.*

The following highlighted ABET outcomes will be individually assessed in this course:

*a) Ability to apply knowledge of mathematics, science and engineering*

b) Ability to design and conduct experiments, analyze and interpret data

*c) An ability to design a system, component, or process to meet desired needs within realistic constraints such as economic, environmental, social, political, ethical, health and safety, manufacturability, and sustainability*

d) Ability to function on multi-disciplinary teams

*e) Ability to identify, formulate, and solve engineering problems*

f) Understanding of professional and ethical responsibility

*g) Ability to communicate effectively*

h) Broad education necessary to understand the impact of engineering solutions in a global and societal context

i) Recognition of the need for, and the ability to engage in life-long learning

*j) Knowledge of contemporary computer science and engineering issues*

*k) Ability to use techniques, skills, and modern engineering tools necessary for engineering practice*

## **15 SE Code of Ethics and Professional Practice**

### **ACM/IEEE Software Engineering Code of Ethics and Professional Practice**

For the full version, see <http://www.acm.org/serving/se/code.htm#full>.

Software engineers shall commit themselves to making the analysis, specification, design, development, testing and maintenance of software a beneficial and respected profession. In accordance

with their commitment to the health, safety and welfare of the public, software engineers shall adhere to the following Eight Principles:

1. PUBLIC - Software engineers shall act consistently with the public interest.
2. CLIENT AND EMPLOYER - Software engineers shall act in a manner that is in the best interests of their client and employer consistent with the public interest.
3. PRODUCT - Software engineers shall ensure that their products and related modifications meet the highest professional standards possible.
4. JUDGMENT - Software engineers shall maintain integrity and independence in their professional judgment.
5. MANAGEMENT - Software engineering managers and leaders shall subscribe to and promote an ethical approach to the management of software development and maintenance.
6. PROFESSION - Software engineers shall advance the integrity and reputation of the profession consistent with the public interest.
7. COLLEAGUES - Software engineers shall be fair to and supportive of their colleagues.
8. SELF - Software engineers shall participate in lifelong learning regarding the practice of their profession and shall promote an ethical approach to the practice of the profession.

## **16 Request for Early Leave**

Requests for permission to go home before the final exam date will never be granted except for medical reasons and with a proof from a doctor. Students who do not participate in the final exam will not receive the scores for the final exam except that the final exam is waived

## **17 Library Information**

(817) 272-3000, ext. 4938; email [lsmith@library.uta.edu](mailto:lsmith@library.uta.edu)  
<http://www.uta.edu/library/research/rt-cse.html> for CSE research information.

# Project Team Member Evaluation Form

Please submit hardcopy or fax to David Kung 817-272-3784, no email

Most team members perform well in a project team. However some members perform extremely well and some very poorly. It is constructive to encourage the outstanding members and inform those who need improvements. This form allows you to convey such information to your team members whenever you deem there is such a need.

Please give an integer rating of -2 (poor), -1 (below average), 0 (average), +1 (above average), or +2 (excellent) for some of the aspects of the members you want to convey your assessment. Your evaluation might be reproduced (to hide your identity) and presented to the relevant members. The identity of the evaluator will be kept absolutely confidential in all cases.

Member name					
Group meeting attendance					
Group discussion					
Individual assignment					
Technical contribution					
Organizational contribution					
Overall performance					

Comments: (use additional sheets if needed)

Name: \_\_\_\_\_ Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Please fill the course info, read, sign and return this statement to the instructor. Thanks.

**Statement of Ethics  
Student Confirmation**  
(CSE\_\_\_\_\_, Spring [], Summer [], Fall [], Year of \_\_\_\_\_)

The following is an excerpt from the College of Engineering's statement on Ethics, Professionalism, and Conduct of Engineering Students. The notes are modifications appropriate for Computer Science and Engineering courses. Read the statement carefully, sign it, and return it to your instructor. A copy of the original policy is available for examination in the Computer Science and Engineering office. Additional copies of this statement can be obtained from your instructor or the Computer Science and Engineering office.

**Statement on Ethics, Professionalism, and Conduct of Engineering Students  
College of Engineering, The University of Texas at Arlington**

The College cannot and will not tolerate any form of academic dishonesty by its students. This includes, but is not limited to 1) cheating on examination, 2) plagiarism, or 3) collusion.

Definitions:

A. Cheating on an examination includes:

1. Copying from another's paper, any means of communication with another during an examination, giving aid to or receiving aid from another during an examination;
2. Using any material during an examination that is unauthorized by the proctor;
3. Taking or attempting to take an examination for another student or allowing another student to take or attempt to take an examination for oneself.
4. Using, obtaining, or attempting to obtain by any means the whole or any part of an unadministered examination.

B. Plagiarism is the unacknowledged incorporation of another's work into work which the student offers for credit.

C. Collusion is the unauthorized collaboration of another in preparing work that a student offers for credit.

D. Other types of academic dishonesty include using other student's printouts from the ACS labs or students' disk, etc.

Notes:

1. The use of the source code of another person's program, even temporarily, is considered plagiarism.
2. Allowing another person to use your source code, even temporarily, is considered collusion.
3. In this class, the specific exceptions given below are not considered scholastically dishonest acts:
  - A. Discussion of the algorithm and general programming techniques used to solve a problem
  - B. Giving and receiving aid in debugging
  - C. Discussion and comparison of program output
4. The penalty assessed for cheating on a given assignment will be twice the weight of the assignment and will include notification of the proper authorities as stipulated in the UTA Handbook of Operating Procedures and on the web at <http://www2.uta.edu/discipline>
5. You may be entitled to know what information UT Arlington (UTA) collects concerning you. You may review and have UTA correct this information according to procedures set forth in UT System BPM #32. The law is found in sections 552.021, 552.023 and 559.004 of the Texas Government Code.

I have read and I understand the above statement.

Student's signature:\_\_\_\_\_

Student's name (printed):\_\_\_\_\_

Student's ID number:\_\_\_\_\_