

Name _____
Student ID Number _____

CSE 5324
Software Engineering I
Exam 1, Fall 1999
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GRADE: _____/100

Please read this:

This is a closed book, closed notes exam. You may use a single sheet of notes **which must be handed in with the exam.**

Use a dark ink (or pencil) and print answers on the test paper following the question or on separate paper. Please **do not write on the back of sheets** of paper **or** on the **back of the exam.** Please **keep answers to questions together** and try to avoid continuing answers off the page.

Turn in all pages of the test. **Write** your answers **legibly.** Unreadable answers will be counted wrong. Make sure you have all pages of the test.

Read each question carefully (twice) and be sure your answer addresses the question. Overly general (non-specific) answers will be counted wrong. If any part of an answer is incorrect (even if other parts are correct) points will be deducted.

Point values are given for each question. The exam has a total of 100 points.

Please turn in the exam promptly when called for. **Late exams will have points deducted.**

Because of limited time the instructor will **not** be able to **answer questions** for the last **five minutes** of the exam time.

Points deducted for:

- [] Writing on back of pages.
- [] Not turning in "reminder sheet" ("cheat" sheet)
- [] Disjoint (non-contiguous) answers
- [] Late exam

1. [15 pts]

Short answers:

- a.) You have been (newly) hired as a software engineer. At your first meeting your boss says: "On our project the requirements will change frequently during the first 6 months (the project is scheduled to complete in 12 months total)." A coworker says: "The incremental model would not be good since a completed increment might need changing but the waterfall model is very good for tolerating changes." Please comment.

- b.) You are a software engineer working on a word processor. During testing, the tester complains that it takes 5 minutes to spell check one page, that is too slow and must be done faster. The tester tells your boss that it must be changed and he (boss) is unsure. You don't have time in your schedule to change the spell checker (unless you work for free on the weekend) and you don't want to change it, anyway. Should you? Whose problem is this - from a software engineering view (hint: the Robertsons suggestions)? Explain.

- c.) What are four characteristics of all high quality requirements?
 - 1.
 - 2.
 - 3.
 - 4.

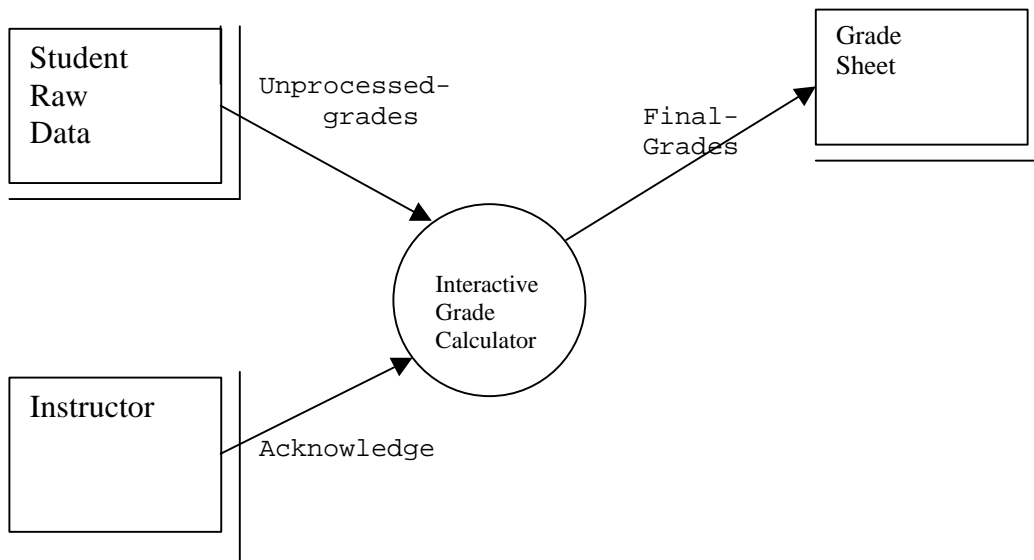
2. [15 pts]

At the Middle-Arlington Institute of Tasting, the Cooking Soup Entity (MIT-CSE) has a small telephone network (PBX). Inside MIT-CSE to call from one telephone to another, inside the CSE, the user dials a 3 digit extension. Extensions are composed of only decimal digits (0,1, ... 9). To dial outside of CSE the user dials 9 followed by the outside telephone number. Inside CSE dialing a 7 connects the user to emergency services (police, fire), dialing a 11 connects to an internal operator (assistance), dialing 12 connects to an external (outside) operator. Show a data dictionary for all legal, internal, normal-user MIT-CSE phone numbers.

3. [20 pts]

A CSE professor wants to develop a program to help her determine grades. The grading software reads raw student data from a file, calculates grades, displays each grade to the professor (who might wish to change it!), then records the grade and student information on a grade sheet.

The level 0 DFD is the following:



The input from the "Student Raw Data" is the following: Student name, followed by student ID, then grades for three exams: 1,2, then 3. Then software calculates the final grade by calculating the sum of the three grades then dividing by 3: $(Exam1+Exam2+Exam3)/3$. Grades 90 and higher are "A", 80 to 89 is "B", 70 to 79 is "C", all others are "F". The student name and the grade are displayed to the instructor who may press "enter" to accept the grade, or change the grade then press "enter". Assume that the formatting of inputs and outputs are given, and the data does not have errors except for the accidental typing error: that occasionally a student's data may be repeated (that is that two or three consecutive entries may be the same student), duplicates must be discarded (they should not appear on grade sheet).

- a.) The level 1 DFD should have 3 processes: one that reads unprocessed grades and eliminates duplicates, one that displays the grade and accepts instructor acknowledgements, and one that prints the final grades to the grade sheet. Show the level 1 DFD. Follow standard methodology.
- b.) Show the Pspec for the process that reads unprocessed grades and eliminates duplicates.
- c.) If there are any errors in the requirements given, list up to two errors (or less, if none or one), what type of errors they are, and how you would resolve them.

4. [20 pts]

Your company (MacroSoft - called MS) wants you evaluate several other companies as potential software suppliers. You decide that the CMM model is a reasonable criteria for evaluating companies.

- a.) Briefly what is the CMM model, how are organizations evaluated?
- b.) 1.) What benefit is a CMM evaluation of a supplier to your company, MS?
2.) What is the benefit to the company being evaluated?
- c.) Assuming that you find the following practices each in a different company, what CMM ranking do you believe each company has, and why?
 - 1.) Company 1: can tell you how many tasks in schedules were completed on time how productive employees are on those tasks, and predict the probability for tasks in future projects.
 - 2.) Company 2: has rigid coding standards and team leaders.
 - 3.) Company 3: tries new techniques to see how they affect the process.

5. [30 pts]

a.) Often, the prototyping model of development is compared to the iterative model, in many ways they are similar. Give 2 similarities and one difference.

Similar:

1.

2.

Differ:

b.) Regardless of the process model, all development process models have helpful (or "desirable") properties (described in class, and by Curtis and Kellner) please list 3:

1.

2.

3.

c.) Regardless of the process model, the requirements process is usually described as 2 (or 3) major steps (or methods).

List 2, and briefly describe what is done.

1.

2.

d.) Is "programming" and "software engineering" the same?
If not, what is the relationship or difference?

e.) One of the most significant issues for software engineers in the last 2 years has been the "Y2K" issue. **From a SE perspective, using SE terminology:**

1.) What is the issue (or problem), who created it?

2.) Who should notice and who should fix Y2K (for a particular product)?

f.) One frequently used software engineering metric (measurement) are "Function Points" (FP). What are 2 (specific) uses or benefits of FP to a software engineer?

1.)

2.)

Bonus:

B1. [5]

Brooks says that when specifications for a software project are done by architects, rather than implementers, the implementers (and designers) object remarking: many implementers will sit idly waiting for architects to finish and this will shut out the creativity of the implementers (and designers).
What is Brooks response to these objections?

B2. [2]

What is the UTA student chapter of ACM doing this month (when, who, what)?