W E B S T E R U N I V E R S I T Y
Center for Graduate and Professional Studies

FINAL EXAM: Chapters 7-12

Student Name:_____

Student Instructions:

Read the following questions carefully, and answer what the question is asking for: "What", "When", "Why", "How Many" and provide examples where required. Use bullet format, short paragraphs (2-3 sentences), diagrams, figures, etc., with explanations to express your knowledge of the topic, concept, or process. Your answer should be no longer than one page for any of the questions.

Each question answered correctly is worth between 10 and 25 points. This exam is worth 30 percent of your overall grade. Partial credit may be awarded for partial answers, so don't leave any questions blank.

1. (10) Your company has asked you to evaluate the risks of building 6000 firmware (SW/HW) units rather than purchasing them from a vendor at $66.50 per unit. Your company has the skills and capacity to build 6000 units. The SW/HW engineers estimate the build costs at: 1) one-time setup cost of $50,000; and 2) production cost of $60/unit. The test/quality assurance personnel inform you that a percentage of the units may be defective as shown below:

% defective	0%	1%	2%	3%	4%
% probability of occurrence	40%	30%	20%	6%	4%

The engineers estimate the costs to remove, repair, replace, and re-test defective units at $145/defective unit. However, 100% of units purchased from vendors are guaranteed to be defect-free.

a. What approach/tool would you use to evaluate the options?
b. Which option would you recommend and what is the basis for the recommendation?

2. (10) Sunrise Distributors recently completed a major data conversion project. Many of its computer-based files had become unreliable, difficult to maintain, and too inflexible to be used to fulfill many end-user reporting and inquiry requests. A RDBMS seemed to be the obvious solution. Two systems analysts were primarily responsible for the conversion project. The systems analysts had decided to simply implement each of the computer-based files as a separate table in their relational database. Once the conversion was completed, the same problems that existed with the file-based system reappeared in the database system. Reports contained inaccurate data, report and inquiry requests could not easily be obtained, and data maintenance was still difficult. What database design goals did the system analysts violate? What should they have done to address the problems of the file-based system?

3. (10) Smith & Sons, Inc. is a large investment company located in Tampa, Florida, that buys stocks, bonds, commodities, and various other assets for their clients. They also manage their clients' investment portfolios for a variety of investment objectives. Finding new people with money to invest is crucial to their success, so keeping track of their clients and potential clients is very important. Morgan Adamson is the senior analyst in charge of the new sales prospect and contact management system at Richards & Sons, Inc. The new system has just been installed and the project team is working with the system users

who are doing acceptance testing. Morgan is talking to Kevin Brock, the junior analyst who was responsible for the design of the system's user interface.

Morgan I guess you've heard that some of the system users are not very happy with the new contact tracking system. In particular, they are expressing dissatisfaction with the user interface that you designed.

Kevin I don't understand what the problem could be -- I put a lot of time and effort into that design. What are the specific problems?

Morgan Some of the users are complaining that they don't know what to do next or how to use some of the screens. Are you sure that all of the screens are consistent throughout this system?

Kevin I didn't think it was important where the information was as long as I clearly labeled it. Besides, the users should be expected to read the screen. I deliberately put lots of highlighting, blinking, and reverse video fields on the screens to draw attention to important information.

Morgan Yes, I know. Some of the users claim that there is so much highlighted information that it distracts from the purpose of the screen. I've also had complaints that proper default values were not specified for some of the fields.

Kevin Default values were specified for the most common fields, but the users should expect to have to type some of the information in -- that's their job, isn't it?

Morgan In some cases, maybe several possible default values should have been provided in a pop-up window to eliminate possible keying errors. Remember, we want to reduce the amount of user entry keystrokes as much as possible. Some of the clerks say that they don't understand some of the terminology and abbreviations on some of the screens.

Kevin Oops! I must not have checked the screens carefully enough to catch some of the computer terminology. That's no big deal. I can fix that right away. Are there any other problems?

Morgan Other users have indicated that the use of certain menu options are not consistent across all of the screens. Didn't you use the same labels and screen buttons or menus for the same actions throughout the entire interface?

Kevin No, I didn't. I thought that I could reuse the buttons/function keys to mean different things as long as I clearly labeled them on each screen.

Morgan Why?

Kevin Some of the keyboards have only 12 function keys, and I was afraid I might run out of keys to assign unless I reused them.

Morgan You need to realize that the system users don't always read the instructions that you provide. Whether that is right or wrong is not important; you need to be consistent so that the users don't have to learn a different set of function keys for each screen.

Kevin I guess I really didn't think that through very well -- it shouldn't be too difficult to make all the function key assignments consistent.

Morgan There have also been some complaints about an insufficient amount of help messages for some of the input screens. For instance, one clerk said the contact entry screen consistently refused to accept the date of contact he tried to enter. The system did output an error message indicating that the date was incorrect and should be reentered, but the clerk doesn't understand why the date was invalid. He says that the system doesn't provide any information about the correct format of the date or any valid examples. You did design help screens and messages for each of the input screens, didn't you?

Kevin Uh, well, I'm not exactly sure what you mean by a "help" screen. I did very thorough input error checking so that invalid data could not be entered. I created error messages for each of the edited fields. I thought that would be sufficient for the users to identify the input error and make the necessary correction.

Morgan I think I'm beginning to understand the problem. We need to talk about some very important human engineering guidelines that you need to follow whenever you are designing a user interface. First ...
(we will leave their meeting now)

a. What are some of the mistakes that Kevin made in designing the user interface?
b. Provide an outline of a strategy that you would follow to avoid these problems.

4. (15) Tim Stallard is a systems analyst at Johnson Electronic Supply. He has only been a systems analyst for six months. Unusual personnel turnover had thrust him into the position after only 18 months as a programmer. Now it is time for his semiannual job performance review. *(Scene Tim enters the office of Ken Delphi. Ken is the Assistant Director of MIS at Johnson.)*

Ken Another six months! It hardly seems that long since your last job performance review.

Tim I personally feel very good about my progress over the last six months. This new position has been an eye-opener. I didn't realize that analysts do so much writing. I enrolled in some continuing education writing classes at the local junior college. The courses are helping ... I think.

Ken I wondered what you did. It shows in everything from your memos to your reports. More than any technical skills, your ability to communicate will determine your long-term career growth here at Johnson. Now, let's look at your progress in other areas. Yes, you've been supervising the Materials Requirements Planning project implementation for the last few months. This is your first real experience with the entire implementation process, right?

Tim Yes. You know, I was a programmer for 18 months. I thought I knew everything there was to know about systems implementation. But this project has taught me otherwise.

Ken How's that?

Tim The computer programming tasks have gone smoothly. In fact, we finished the entire system of programs six weeks ahead of schedule.

Ken I don't mean to interrupt, but I just want to reaffirm the role your design specifications played in accelerating the computer programming tasks. Bob has told me repeatedly that he had never seen such thorough and complete design specifications. The programmers seem to know exactly what to do.

Tim Thanks! That really makes me feel good. It takes a lot of time to prepare design specifications like that, but I think that it really pays off during implementation. Now, what was I going to say? Oh yes. Even though the programming and testing were completed ahead of schedule, the system still hasn't been placed into operation; it's two weeks late.

Ken That means you lost the six-week buffer plus another two weeks. What happened?

Tim Well, I'm to blame. I just didn't know enough about the nonprogramming activities of systems implementation. First, I underestimated the difficulties of training. My first-draft training manual made too many assumptions about computer familiarity. My end-users didn't understand the instructions, and I had to rewrite the manual. I also decided to conduct some training classes for the end users. My instructional delivery was terrible, to put it mildly. I guess I never really considered the possibility that, as a systems analyst, I'd have to be a teacher. I think I owe a few apologies to some of my former instructors. I can't believe how much time needs to go into preparing for a class.

Ken Yes, especially when you're technically oriented and your audience is not.

Tim Anyway, that cost me more time than I had anticipated. But there are still other implementation problems that have to be solved. And I didn't budget time for them!

Ken Like what?

Tim Like getting data into the new databases. We have entered several thousand new records. And to top it off, operations has requested that we run the new system in parallel with the old system for at least two months. I am weighing the pros and cons, and will be presenting a changeover plan to senior management approval next week.

Ken Well, Tim, I think you're learning a lot. Obviously, we threw you to the wolves on this project. But I needed Bob's experience and attention elsewhere. I knew when I pulled Bob off the project that it could introduce delays -- I call it the rookie factor. Under normal circumstances, I would never have let you work on this alone. But you're doing a good job and you're learning. We have to take the circumstances into consideration. You'll obviously feel some heat from your end-users because the implementation is behind schedule, and I want you to deal with that on your own. I think you can handle it. But don't hesitate to call on Bob or me for advice. Now, let's talk about some training and job goals for the next six months.

a. Above and beyond programming, identify the other activities make up systems implementation.
b. Identify the specific groups of trainees, and the type of training you would recommend for each group.
c. What initial assumption do you think Tim made about changeover from the old system to the new system? Identify the changeover approach you would recommend for the Materials Requirements Planning system?

5. (15) The M. State University is a large, public, metropolitan university located within 20 miles of four cities in Minnesota. *(Scene: Kurt Wilson, Director of Administrative Information Management (AIM), is meeting with Paula Teague, Assistant Director of Applications Development.)*

Kurt Good morning, Paula. How's the cold?

Paula Much better, thank you. It's good to be back. I assume this is the meeting I had to cancel when I got sick?

Kurt Right. As you know, the administrative information systems master plan will be complete within the next three months. Assuming the executive committee approves the plan, the real work begins -delivering the new business processes and applications outlined in the plan.

Paula I've been wondering when you were going to address that issue. We can't keep up with new systems development requests as it is. Am I going to get additional staff.

Kurt I'm afraid not. In this era of staff downsizing, I suspect that we'll be lucky to hold on to what we have.

Paula Well, I know we can increase productivity using CASE tools driven off the planning models your staff has recorded in the new repository. But there is a learning curve with CASE technology, as well as the new methodology. Also, these new applications call for a greater degree of adaptability and integration than we have historically expected. I just don't see how we can deliver more systems with the same or fewer people.

Kurt I've got an idea. I've been running some numbers against the time accounting system. According to our own records, we are using 19.3 FTE (full time equivalent staff) to simply support existing systems maintenance.

Paula That wouldn't surprise me. Legacy code is the anchor that inhibits new systems development in all shops. Don't tell me you are going to eliminate existing systems support? I think there would be an immediate and fatal backlash from the user community.

Kurt True, but that's not exactly what I had in mind. Don't have a cardiac, but what would you say if I told you that I wanted you to consider reducing your maintenance effort to 8.5 FTE? [Paula does not respond] Your silence indicates that you are concerned.

Paula And rightfully so, don't you think? The user community will scream for my head on a platter! You are talking about cutting support by more than 50 percent.

Kurt Actually, Paula, I'm asking you to cut support by less than 25 percent, but to use 50 percent fewer people!

Paula And how am I supposed to do that?

Kurt I have a couple of ideas for you to consider. First, according to my analysis of change request forms, almost two-thirds of all requests fall into the category of enhancements. Half of those enhancements can be characterized as "desirable," not "essential." It seems to me that we could declare a temporary moratorium on such maintenance projects.

Paula I can't confirm your numbers, but I'll agree that we are going to have to be pickier about what we choose to do and not do. I'd like to see your data after this meeting.

Kurt No problem! Second, I'd like you to consider a SWAT team approach to maintenance.

Paula SWAT? Like the police?

Kurt SWAT stands for "Specialists With Automated Tools." With only 8.5 FTE for maintenance, it seems to me that it would be a mistake to assign one or two persons per existing development team. Instead, I see a maintenance SWAT team that takes over all maintenance.

Paula It might work. I'd want to make sure the SWAT team had at least one member from each current development team to preserve application knowledge. But what's the "automated tools" angle?

Kurt Glad you asked that. Our luncheon meeting will be with a sales representative from a company called VIASOFT. They sell what amounts to CASE tools for maintaining, enhancing, and reengineering our existing software programs. They promise to increase productivity of maintenance programmers who specialize in the tools.

Paula Now we're talking. There would be the usual learning curve, but once the team is comfortable with the technology, we might just be able to do 75 percent of our existing maintenance with less than 50 percent of the existing staff.

Kurt I think so! In fact, I'll make a bolder prediction. In time, I think you'll eventually be able to increase support over today's levels with less than 50 percent staff. Anyway, you're a pretty creative person. Give some more thought to ways we can make this work. We need to go to our luncheon date.

a. If “essential” enhancements are submitted, what process should be followed to select those that will be implemented?
b. Can you think of any aspects of systems support that have not been addressed by Kurt's SWAT and technology proposals?
c. What additional analysis would you recommend to Kurt before making a final decision on reducing systems support staff?

6. (15) George Amana is a programmer/analyst for Tower Lawn and Garden, Inc. Tower is a distribution center for lawn and garden equipment in northern Louisiana. George just sat down to lunch in the company cafeteria. Pete Wilcox, a senior partner in the firm, joins him.

Pete Hey, George, you look pretty frustrated. What's the problem?

George I had to take over the sales information systems project that Judy left behind when she quit. It's total chaos. I was told that it was all but finished. Come to find out, she didn't finish several of the programs.

Pete But she did do a good job of specifying all of the program requirements. What's so tough about the programs? Judy always preached about the benefits of structured programming. In fact, she taught me how to do it. Don't tell me she doesn't practice what she preaches.

George No, her code is very well structured. And her documentation is adequate. It's just that the programs seem so poorly designed. Some of her subroutines are so long and complex that it's difficult to get a grasp on small enough pieces to test them for correctness. It seems like an all-or-nothing proposition. If I encounter a bug, I have to test large sections of code to zero in on the problem. Sometimes the bug turns out to be in an entirely different subroutine!

Pete Why didn't Judy break the system into smaller pieces?

George Oh, she did! The modules are evidence of that. But it almost seems like she generated the modules on the fly - as if to say, "Well, this piece of code is getting complex, I'd better put it in a module to finish it." She left me a rough draft of a structure chart, but I just don't understand the reasons she factored the system the way she did.

Pete That's the way I write programs, I start by trying to draw a flowchart on a single page - sort of the high-level flowchart. Then I factor the more complex processes into more detailed processes that I implement as modules. It sounds like that may be what Judy did.

George Maybe she did. But that strategy causes the lower-level modules to be very dependent on other routines. I frequently encounter bugs that get traced back to other, seemingly unrelated routines. I'm just getting further behind schedule. I may just have to rewrite the programs from scratch.

Pete Why don't you get some help? Barbara just finished her project. Maybe she can help you. You could divide up the work and get it done faster.

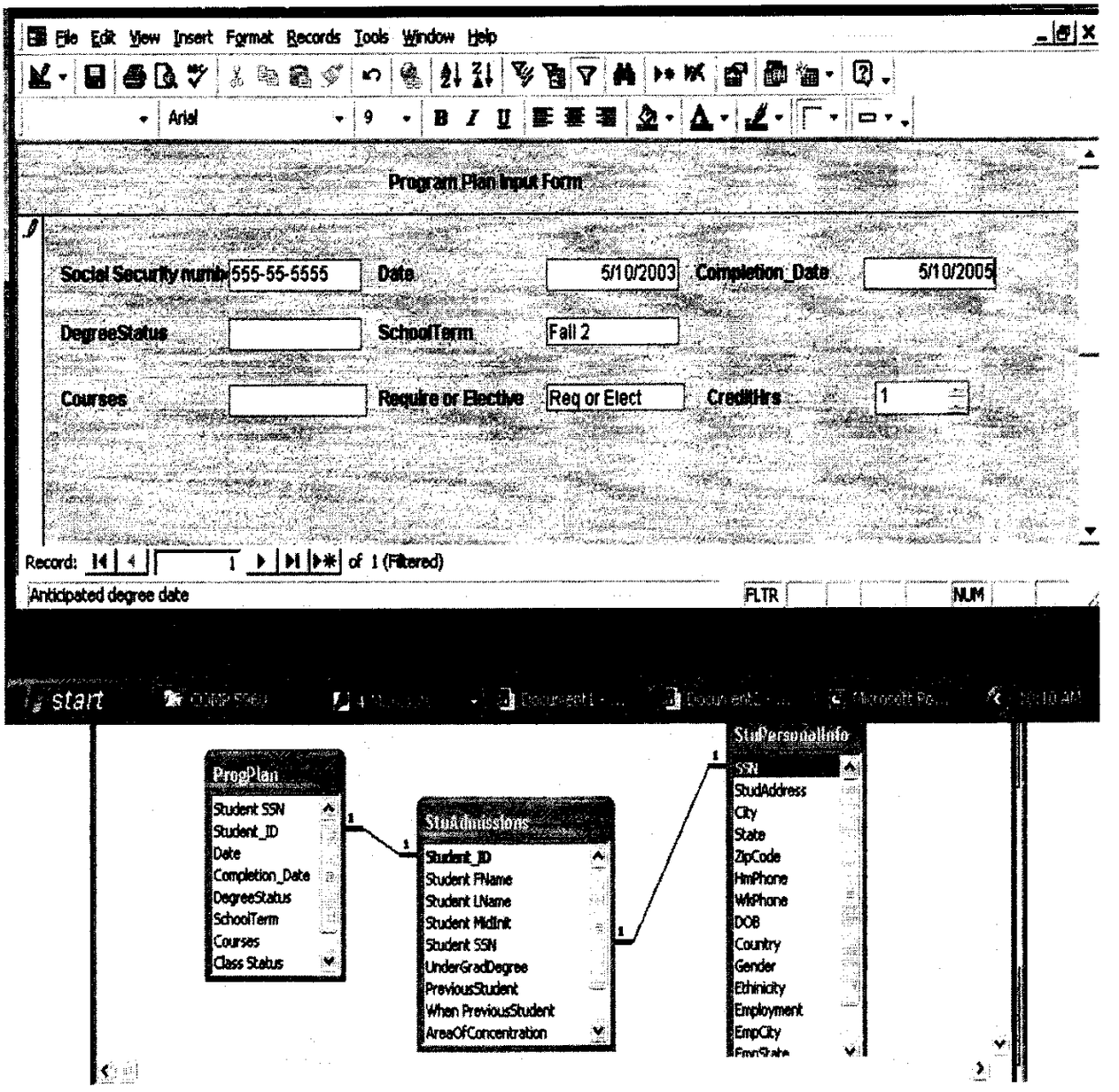
George Divide up the work? I don't see how. Judy's program specifications are just one big unorganized document. I'm not sure which file and report specifications to match up to which modules. For that matter, I'm not sure the programs themselves are fully documented.

Pete Well, I'm sorry, George. I don't know what to tell you.

a. What approach did Judy use to create the program modules?
b. How should modules in a program be conceived?
c. What effect does the program and module size have on testing?

7. (25) Webster University would like to automate some of their paper forms/processes. The manual Program Planning Worksheet currently used by Webster advisors and students to identify the courses required to meet their degree requirements is at this link: http://www.webster.edu/documents/arts-and-sciences/pdfs/bass_forms/planning_worksheet.pdf.

Webster would like for a student's program plan data to be entered using an on-line input form and stored in a database. Then, a program plan report similar to the manual worksheet (at the above link) could be printed, as required. Review the following prototype design for an automated Program Plan input form and database.



a. List the form and database design problems with this design.
b. Develop an improved input form and database design for a Webster student to enter/store Program Plan data. You do not have to design the report.

Note: MS Access can be used to develop the input form and data tables design, but it is not mandatory.