Memorandum (remove this page before submitting the examination)

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| **To:** | Students, SMU CSE 7315 |
| **From:** | Dennis Frailey |
| **Date:** | Spring, 2015 |
| **Subject:** | Format and Procedures for Final Examination |

**Read this memorandum before looking at the rest of the examination.**

**THIS EXAMINATION IS TO BE PERFORMED ON THE HONOR SYSTEM.**

**The examination for Spring, 2015, consists of a written exam (OPEN book). The maximum time is 8 hours. You may consult your course materials or textbook or personal notes, BUT NOT OTHER STUDENTS AND MAY NOT CONSULT THE INTERNET.**

**You will take the exam electronically – download it from the Blackboard and upload the completed exam within 8 hours. As a backup, email the completed exam as an attachment to** [CSE7315@lyle.smu.edu](mailto:CSE7315@lyle.smu.edu)

**- the subject line should say E2 CSE7315 2015sp Last First[your first and last name]**

**- the file name should be E2 CSE7315 2015sp Last First.docx**

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**For students editing the "word" file, your answers should all appear in the "answer" style, which will have a blue color. This makes it easy for me to tell what you wrote. You may expand the space provided if your answers need more space. Use the “replace" function to change “First Last" in the footer with your name, so I don't get exams mixed up.**

(cover sheet - should appear as the first page of what you turn in)

FINAL EXAMINATION

**CSE 7315 -- PLANNING AND MANAGING A SOFTWARE PROJECT**

**SPRING, 2015**

E1

Professor Dennis J. Frailey

PUT ALL ANSWERS ON THE EXAM

NOTE: READ THE QUESTIONS BEFORE YOU ANSWER THEM. PROVIDE ALL INFORMATION REQUESTED. PUT ALL ANSWERS IN THE ANSWER BOX. EXPAND THE SIZE OF ANY ANSWER BOX IF YOU NEED MORE SPACE.

NAME: \_\_\_RUTUJA MANDHARE\_\_\_\_\_\_ CONTACTINFO:\_rmandhare@smu.edu[during May, 2015]

DATE EXAM WAS TAKEN: 5/10/2015\_AMOUNT OF TIME SPENT: 10 hrs

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MIDTERM \_\_\_\_\_\_\_\_\_\_\_\_\_\_

FINAL \_\_\_\_\_\_\_\_\_\_\_\_\_\_

A5 (SW Dev. Plan) \_\_\_\_\_\_\_\_\_\_\_\_\_\_

OTHER ASSIGNMENTS \_\_\_\_\_\_\_\_\_\_\_\_\_\_

COURSE GRADE \_\_\_\_\_\_\_\_\_\_\_\_\_\_

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GRADE TEMPLATE FOR FINAL EXAM:

1) \_\_\_\_\_\_\_\_ /24 SCHEDULING

2) \_\_\_\_\_\_\_\_ / 24 TRACKING AND OVERSIGHT

3) \_\_\_\_\_\_\_\_ / 10 RE-ENGINEERING

4) \_\_\_\_\_\_\_\_ / 26 CONFIGURATION MANAGEMENT

5) \_\_\_\_\_\_\_\_ / 16 QUALITY ASSURANCE

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1) (24 points) SCHEDULING

a) (8 points) Briefly**explain** the PERT technique and what it shows about the tasks required in a software development project. Assume that there is no task duration or labor effort information in the PERT. **Use an example** to illustrate a simple PERT chart.

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| “PERT” stands for "Program Evaluation and Review Technique". PERT involves statistical analysis of project schedules and plans. PERT technique is used to illustrate the flow of events in a project. PERT is a method to evaluate and estimate the time required to complete a task within deadlines. PERT chart is basic tool of the PERT technique, which represents the schedule and resource needs of a project. PERT chart is a project management tool used to schedule,organize and coordinate tasks with a project.   * PERT chart task identifies dependencies, some of which perhaps did not exist. * It identifies missing dependencies where we do not have the idea about the successor or the predecessor * It identifies critical dependencies, such as an external activities. * A Basic PERT chart shows dependency & flow and can find many problems * The information in a PERT chart is represents a graphical view of how the project must proceed, what tasks are dependent on previous tasks. * For example- The PERT chart shows different tasks- requirements,design,Detailed design,code,test plan,test,integration.   Test  Integration  code  Test plan  Design  Requirements  DetailedDesign |

b) (8 points) Briefly **explain** what a CRITICAL PATH is and **explain** what information needs to be added to the PERT in part a) in order to compute the critical path. Amend the example from part a) to show a PERT with a critical path identified.

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| The longest path (In terms of time duration) from the first task to the last task. Since it is the longest path, there maybe a risk associated with it as any change in that schedule the overall schedule is in trouble. If the critical path is shortened, then the overall project schedule is shortened.  Design  (2 weeks)  code(4weeks)  Test  (2weeks)  Requirements  (3 weeks)  DetailedDesign  (1 week)  Integration  (1 week)  Test plan (2weeks)  Task duration is to be added in order to compute the critical path. In the above example the critical path is Requirements(3 weeks), Design(2 weeks),Detailed design(1 week),code(4 weeks),Test(2 weeks) and Integration(1 week). This is the longest calendar path through the schedule from the first to the last activity which takes 13 weeks to complete. |

c) (8 points) **Explain** what a GANTT chart is and show, with an **example**, how it differs from a PERT chart. Example must be different from the ones used in class.

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| GANTT chart provides a graphical representation of the schedule of the same data as in PERT chart but the focus is on relative time phasing. The activity box in the gantt chart represents the length of the time it takes. The boxes shows the order of execution.A GANTT chart shows the steps by which tasks should be carried out. GANTT chart is used to show summary of the whole project. PERT chart includes dependancies of the tasks.PERT chart tells importance or effect of timetable slips.PERT chart advises whether it is realistic to anticipate that you will meet the schdule,but the GANTT chart does not tell that you will meet the schedule or not. PERT chart tells the critical path which is nothing but the longest path.GANTT chart does not include the critical path.  Requirements  Design  code  Test  Integration |

(24 points) TRACKING AND OVERSIGHT

a) (10 points) One purpose of graphs and measurements is to provide visibility so that the manager can understand what is really going on and take action when performance deviates from plans.Give an **example** of a measure that provides visibility into a software project, provide a sample graph, and **explain** the sample graph. **NOTE: FOR YOUR EXAMPLE, USE A MEASURE AND GRAPHTHAT ARE DIFFERENT FROM ANY OF THOSE USED IN THE CLASS NOTES.**

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| **Explain** what you are measuring here (4 points) including the data being collected, any formulas used to compute the measure, and what type of graph you will use to display it.  Measuring Employee Count of Software Project Team as planned and actual.  The graph used is simple Bar Graph.  Below the Data:  Month Actual Planned   |  |  |  | | --- | --- | --- | | Jan | 30 | 30 | | Feb | 28 | 30 | | Mar | 27 | 30 | | Apr | 25 | 20 | | May | na | 20 | | Jun | na | 20 | | Jul | 20 | 20 | | Aug | na | 10 | | Sep | 15 | 10 | | Oct | 10 | 10 | | Nov | na | 5 | | Dec | 5 | 5 | | |
| Put **Sample Graph**Here (3 points). [Hint: draw the graph in Excel or some other graphing tool and then copy and paste here – paste as a bit map] | **Explain** Sample Graph Here (3 points).  The X-axis shows months and Y-axis shows number of employees. While collecting data we found there were no data available from the sharepoint for months of May, June, Aug and Nov. This may cause due to the no data entered by project leads due to respective milestone release in those months or may be some issue in the sharepoint portal which may cause the data to be missed.  The graph is very much following the planned employee count which only 10-20% varience in the month of Feb, Mar, April, Sept mainly. |

b) (6 points) **Explain** the Goal, Question, Measure paradigm and illustrate with an **example**, showing *at least two questions and two measures for each question*.***These must be different from the ones discussed in the class lectures and course slides***.

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| Goal : To provide adequate visibility  into actual progress so that  management can take effective  actions when the software  project’s performance deviates  significantly from the software  plans  Question: What measurement criteria actually will help to software development plan for  tracking and communicating status. To track schedule, size, effort, computer  resources, technical activities and risks.  Measure paradigm: Every Measure Should Have a  Purpose - You Want to Get  Information. Define how to interpret  Measurements. Choose consistent display  or graphing techniques  E.g. :  Question: Measuring the satisfaction level of customer after using a product to make video call.  Measurement: How is the Video Quality?, How is the Audio Quality?, How accurate is the call?  Question: How much time and resources takes us for a release?  Measurement: Amount of time and number of recourses taken in the past release.  Measurement: Amount of time and number of resources taken the present release. |

c) (8 points) **Explain in your own words (**as if explaining to a colleague**) what is meant** by the following statement: “there must be an organizational framework for understanding the importance of measurement.” Then **explain what must be done** to achieve such a framework.

| What is meant (4 points) |
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| Organizational framework plays an integral role in getting the honest response or data from the employees about the measurement needed. If they will have a sense of fear that they may be sacked or fired on providing the data which may turn against them, they will manipulate the measurement matrices and give away bloated data to be safe. They know how to use measurement properly. |

| How to Achieve (4 points) |
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| The measurement criteria should be encouraging and not making a fearful outcome. It shows where they can improve instead where they did wrong. We should train everyone on the proper use of measurements. We have to measure only what we want and involve who are being measured. The decisions taken from the measurement should be used to measure the product, process and project. |

3) (10 points) **Re-Engineering**

a) (5 points) Some people you work with say “*we’ve always done it that way. If it isn’t broken, don’t fix it.*” But others say *“our methods are out of date and need to be re-engineered”*. **Explain** why processes and organizations need periodic re-engineering. In your explanation, address the “don’t fix it” argument.

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| * In Re-Engineering**,** it is necessary to reinvent the process from time to time. This can come from competition with other company, better technologies, new customers, some changes in the environment, new laws etc.Establish the direct connections with different stakeholders(customers,suppliers,employees). Continuous process improvement is necessary to remove the flaws, minimize errors and improve results. Better process would be more efficient in the long run and might prove to provide better results. |

b) (5 points) “*If re-engineering is such a good idea, we should do it all the time*,” says someone who is impressed with your arguments. **Explain** why this may not be a good idea.

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| Continuous re-engineering is not a good idea all the time. The process and technical features need to be taught to the team every time a new process is introduced. This may lead to more cost and waste of resources.  Continuous re-engineering may not build confidence to customers and other stakeholders.  Constant Changes may introduce errors, add complexity, chaos to the projects. (eg: changing from waterfall model to agile model during half the time of the project)  There would be issues in long-term if re-engineering is done all the time. |

4) (26 points) CONFIGURATION MANAGEMENT

a) (4 Points) **Explain** why change causes software to deteriorate

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| Any change in the software might inject errors or cause errors. Unmanaged change causes failure of the software to deliver the systems on time and within budget. Change leads to chaos unless efficient management decisions are made. According to Eigenvalue method, doubling the size of the software quadruples the probability of error when making change |

b) (12 points) In the table below are three strategies you can take to manage the inherent tendency of software to deteriorate. Fill in the table by **explaining** each strategy, giving its **advantages**, and its **drawbacks**.

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| **Strategy** | **Explain** | **Advantages** | **Drawbacks** | **When Recommended** |
| **Discard and Redo** | When there is a worst case scenario in the project, the software is discarded and it is started again. | It avoids chaos as 'Discard and redo' is adopted as a result of worst case. | The cost and time is more. The application won't be stable. | When it is a short-lived application or a gaming software. Mostly recommended to e-commerce applications. When the application fails and there is no idea how to fix it and starting first is the best approach. |
| **Maintenance** | It is the effort which is invested to preserve integrity. When we need to resort to the worst case scenario it helps stave off the time. | Software lasts longer. Correct bugs when they are found and thereby keeping in good condition. | Spend time to maintain (Cost is more). | When you want the application last long then you need to have a good configuration management strategy. |
| **Design for Maintain-ability** | Design the software to make it more maintainable. | Accurate design documentation, Good configuration management. | Software developers may not favor them as there is lot of work and they favor programming. It has more work involved. | When the cost of the system should be reduced. |

c) (10 points) For each of the following configuration management roles, **list two basic responsibilities** of the person in that role and **two questions** that an individual with that role would be expected to know the answer to (first two roles only for this part).

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| **Role** | **Basic Responsibilities (2)** | **Questions Answered (2)** |
| **Configuration Manager (Librarian)** | Main source for all the changes that are being deployed. Establishes project baselines and backups for recovery purposes. Also keeps the track of all the changes implemented. | Before the next version of the software is released what tests have been run and what tests have to be run?  What will the current version or the next version of the software be composed of? |
| **Module Owner** | In charge of the technical incorruptibility of the software component. Must know and understand the interfaces from the module. | How does the module work?  How the module is supposed to be called or used? |
| **Change Control**  **Board** | Makes sure that all the ramifications of any proposed change are understood. Authorizes work to make changes. Authorizes incorporation of changes after suitable tests. | No answer required here |

5) (16 points) QUALITY ASSURANCE

a) (7 Points) **Explain** the difference between quality control and quality assurance. Give an example of an activity that is performed with quality assurance that is not performed with quality control. **Explain** which one has greater benefits and give an **example** of one of the benefits.

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| Quality Control (Defect Identification)- Product oriented and focus is more on the defect identification. Hybrid techniques are often used. It does not focus on improvement as similar problems continue to occur. It is the responsible of specific team who tests the product.  Example: Validation, establishing standards, process documentation.  Quality Assurance (Defect Prevention) - The focus is more on the process i.e. make developer and management understand the process that is followed and the product. It assures that the quality is achieved by improving the process, standards and adding quality during development. Provides an effective Quality control procedure/mechanism.  Typical quality assurance practices are Inspections, reviews, audits, measurement etc.  Responsibilities include: Review development plans, Participate as inspection moderators, Make sure tests are proper and run properly, periodically audit management process. Everyone on the team involved are responsible in QA.  Quality Assurance has greater benefits than Quality Control.    Example: Verification |

b) (9 points) List 3 pitfalls in implementing quality assurance in an immature organization that currently does only quality control. Explain each pitfall.

| **Pitfall (1 point each)** | **Explain (2 points each)** |
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| Operating without proper documentation and approved development standards. | Since the development group does not create verifiable quality plans, there's no consistent, documented set of procedures and process to perform quality assurance. Because of this, there is a debate on bug priority rather than product quality. |
| Disputes on responsibility on product quality and performing QA functions. | Managers and software developers are responsible for the quality of the product.Quality assurance is a method which help them to achieve quality through independent evaluation of their work.   * The quality professionals should not be doing all of the quality assurance functions, testing, etc. * Although they may do some, such as collecting measurements, record keeping, etc. |
| Lack of skilled QA staff | Software professionals tend to favor development (coding) over QA. Also, an immature organization may not hire a well qualified QA professional and might use a developer to perform QA activities. To cut costs, they might hire an unskilled staff and not enforce in trainings. |
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**END OF EXAM**

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