If this lab is an Individual assignment, <u>you must answer all of the questions on your own</u>. You are welcome to use the slides, the Internet, and your text book to answer all questions.

These short answer questions will be spot checked and graded for completion, but not checked for accuracy. I encourage you to form a study group; get together to prepare for exams. Once your homework and labs are graded and returned, I encourage you to compare answers others in your study group who have also had the lab, or homework, graded and returned. You may not share this work outside the class; it is a violation of academic integrity to share your work with others outside the class. It is a violation of academic integrity to receive the software engineering work completed by other students. You must answer at least 90% of these questions correctly!

I/We realize that the penalty for turning in work that is not my own, or assisting others in doing so, can range from an "F" in the class to dismissal from Trinity University.

Print Name _____   Time Required = _____.____ Hrs.

Signature _____

Software Quality Management & Assurance
Chapter 19-21 Homework
Individual Lab
15 Point

1] _____ Variation control in the context of software engineering involves controlling variation in the
A) process applied   B) resources expended   C) product quality attributes   D) all of the above

2] _____ {T/F} There is no need to assess customer satisfaction when trying to determine the quality of a piece of software.

3] _____ A key concept of quality control is that all work products
A) are delivered on time and under budget   B) have complete documentation
C) have measurable specifications for process outputs   D) are thoroughly tested before delivery to the customer

4] _____ {T/F} The goal of quality assurance is to provide management with the data needed to determine which software engineers are producing the most defects.

5] _____ Quality costs may be divided into costs associated with
A) prevention, appraisal, and failure   B) people, process, and product
C) customers, developers, and maintenance   D) all of the above

6] _____ {T/F} Software quality might be defined as conformance to explicitly stated requirements and standards, nothing more and nothing less.

7] _____ {T/F} People who perform software quality assurance must look at the software from the customer's perspective.

8] _____ Which of these activities is not one of the activities recommended to be performed by an independent SQA group?
A) prepare SQA plan for the project
B) review software engineering activities to verify process compliance
C) report any evidence of noncompliance to senior management
D) serve as the sole test team for any software produced

9] _____ {T/F} The purpose of software reviews is to uncover errors in work products so they can be removed before moving on to the next phase of development.

10] _____ {T/F} In general the earlier a software error is discovered and corrected the less costly to the overall project budget.

11] _____ {T/F} Defect amplification models can be used to illustrate the costs associated with using software from its initial deployment to its retirement. (From Book)

12] _____ At the end of a
formal technical review all attendees can decide to reject the product due to Sev_?_ Er_?_ (what?)

13] _____ At the end of a formal technical review all attendees can decide to
A) accept the work product without modification   B) modify the work product and continue the review
C) reject the product due to stylistic discrepancies   D) reject the product due to severe errors

14] _____ A review summary report answers which three questions?
A) terminate project, replace producer, request a time extension
B) what defects were found, what caused defects, who was responsible
C) what was reviewed, who reviewed it, what were the findings
D) none of the above

15] _____ {T/F} In any type of technical review, the focus of the review is on the product and not the producer.

16] _____ {T/F} Sample driven reviews only make sense for very small software development projects.

17] _____ {T/F} Attempts to apply mathematical proofs to demonstrate that a program conforms to its specifications
are doomed to failure.

18] _____ Statistical quality assurance involves
A) using sampling in place of exhaustive testing of software
B) surveying customers to find out their opinions about product quality
C) tracing each defect to its underlying cause, isolating the "vital few" causes, and moving to correct them
D) tracing each defect to its underlying causes and using the Pareto principle to correct each problem found

19] _____ Software reliability problems can almost always be traced to
A) errors in accuracy   B) errors in design   C) errors in implementation
D) errors in operation   E) both b and c

20] _____ Software safety is a quality assurance activity that focuses on hazards that
A) affect the reliability of a software component   B) may cause an entire system to fail
C) may result from user input errors   D) prevent profitable marketing of the final product

21] _____ Poka-yoke devices are mechanisms that lead to the
A) creation of quality processes with minimal resources   B) determining causes of software defects
C) prevention of potential quality problems   D) rapid detection of quality problems introduced
E) both c and d

22] _____ Which of the following is not a section in the standard for SQA plans recommended by IEEE?
A) budget   B) documentation   C) reviews and audits   D) tests

243 According to the slides, the two kinds of Software Quality that might be may be encountered are

_____ Quality of Des_?_
encompasses requirements, specifications, and the plan for putting the system together.

_____ Quality of Conf_?_
is an issue focused primarily on implementation.

24-25] **User Satisfaction** is often defined by the equation:

User Satisfaction =   Compliant Pr_____   +

                              Good Qu_____ _____   +

                              Delivery Within Bu_____   +

                              Delivery On Sc_____

26] According to the slides there were three major costs associate with Software Quality. List them:

_____ Pre_?_ costs
[include quality planning, formal technical reviews, test equipment, and training]

_____ Int_?_ failure costs
[include rework, repair, and failure mode analysis]

_____ Ext_?_ failure costs
[include complaint resolution, product return and replacement, help line support, and warranty work]

27] _____ Software Q_?_
Management is concerned with ensuring that the required level of quality is achieved in a software product

28] _____ According to the
slides, Software Quality Management involves defining appropriate quality Sta_?_ and procedures and ensuring that these are followed.

29] _____ According to the
slides, Software Quality Management should aim to develop a 'quality culture' where quality is seen as Ever_?_ responsibility

30] _____ Sommerville says
that "Quality, simplistically, means that a product should meet its Sp_?_.

31] According to the slides, there are 3 reasons quality is problematical for software systems. List them.

_____ Tension between
Cus_?_ quality requirements (efficiency, reliability, etc.) and developer quality requirements (maintainability, reusability, etc.)

_____ Some quality
requirements are Dif_?_ to specify in an unambiguous way

I_____ Software
specifications are usually I_?_ and often inconsistent

32] What is the "software quality compromise" addressed in the slides? [Hint: it has to do with the fact that "software specifications are imperfect"

_____

_____

_____

_____

cost to find and fix a defect

SQA = Software Quality Assurance
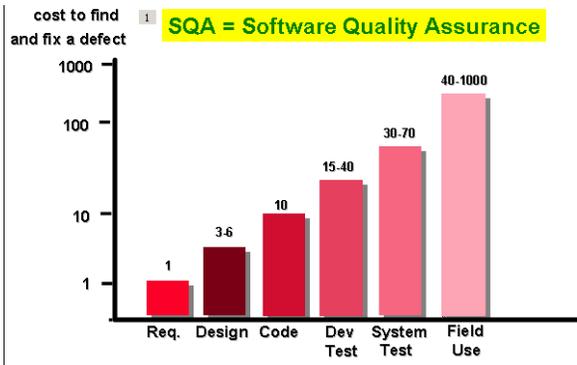
33] In the space below, discuss the significance of the graph above:

_____

_____

_____

34] _____ _____ The further into the development cycle one goes before discovering a defect, the more it costs to fix it. In accordance with the chart exposed in the text and the slides, it will cost _?_ to _?_ times as much to fix an error once it has been installed, as opposed to finding that same error at the Requirements stage.

35] S_____ Q_____ A_____ SQA is an acronym for _?_

36] _____ The SQA group prepares an SQA Pro_?_ Pl_?_ for a project; it would include (1) evaluations to be performed, (2) audits and reviews to be performed, (3) standards that are applicable to the project, (4) procedures for error reporting & tracking, (5) documents to be produced by the SQA group, and the (6) amount of feedback provided to the software project team.

37] _____ The SQA group participates in the development of the project's software Pro_?_ description; it should be compliant with the organizational policy, internal software standards, and externally imposed standards (e.g., iso-9001).

38] _____ The SQA Group reviews software engineering activities to verify Comp_?_ with the defined Software Process. The SQA group identifies, documents, and tracks deviations from the Software Process and verifies that corrections have been made.

39] _____ The SQA Group ensures that deviations in software work and work products are Doc_?_ and handled according to a documented procedure.

40] _____ Software Quality Reviews are Mee_?_ conducted by technical people for technical people.

41] _____ Software Quality Reviews a technical assessment of a Wo_?_ product created during the software engineering process.

42] _____ Software Quality Reviews are not a project Sum_?_ or progress assessment.

43] _____ Software Quality Reviews are not a meeting intended solely to impart Inf_?_.

44] _____ Software Quality
Reviews are not a mechanism for political or personal REP_?_.

45]   The slides include eight recommendations for successful software quality reviews List these 4 of them.

_____ Be Pre_?_ →
evaluate the product before the review

_____ Review the Pro_?_,
not the Producer

_____ Keep your tone mild,
ask questions instead of making Acc_?_

_____ Raise Issues, don't
Res_?_ them

46]   The slides include eight recommendations for successful software quality reviews List these 4 of them.

_____ Avoid Discussions
of Sty_?_ →stick to technical correctness

_____ Schedule Reviews
as Pro_?_ tasks

_____ Rec_?_ and Report
all review results

_____ Stick to the Review
Age_?_

47] The slides describe 4 review processes. The following were abbreviations for

_____ IPR is the
abbreviation for Inf _?_ Pe_?_review

_____ WT is the
abbreviation for a Wa_?_ Th_?_review

_____ IN is the
abbreviation for a Ins_?_ review

_____ RRR is the
abbreviation for a Rou_?_ Rob_?_ review

48]   The slides describe the three major software quality management activities. List them.

_____ Quality As_?_ →
establishes organizational procedures and standards for quality

_____ Quality Pla_?_ →
selects applicable procedures and standards for a particular project and modify these as required

_____ Quality Cco_?_ →
ensures that procedures and standards are followed by the software development team

49]   _____ {T/F} Quality management should be separate from project management to ensure independence

50] _____   _____ ISO 9001:2000 is an international set of standards for Qu_?_ Man_?_ that applies to software engineering. (not on exam)

51] _____   _____ ISO 9001:2000 is applicable to organizations which Des_?_, evD_?_ and maintain products. (not on exam)

52] _____   _____ ISO 9001:2000 is a generic Mod_?_ of the Qua_?_ process that must be instantiated for each organization. (not on exam)

53] _____ ISO 9001:2000 quality standards and procedures should be documented in an organizational quality manual. External body may certify that an organization's quality manual conforms to ISO 9001:2000 standards. Customers are, increasingly, demanding that suppliers are ISO 9001 Cer_?_. (not on exam)

54] The slides provide three reasons that standards are important. List them.

_____ Standards help to encapsulate the "best practice of your previous projects" and to avoid the repetition of past Mis_?_.

_____ Standards are the Fra_?_ for quality assurance - it involves checking standard compliance

_____ Standards provide Con_?_ - new staff can understand the organization by understand the standards applied

55] The slides provide three problems with standards. List them.

R_____ One of the problems with standards is that they are not always seen as R_?_ and up-to-date by software engineers

F_____ One of the problems with standards is that they involve too much bureaucratic F_?_ filling

T_____ One of the problems with standards is that they are generally unsupported by software T_?_ so tedious manual work is involved to maintain standards

56] The slides provide three recommendations for the development of internal standards. List them.

_____ Involve the So_?_ En_?_ in development; they should understand the rationale underlying a standard

_____ Review standards and their usage Reg_?_ Standards can quickly become outdated and this reduces their credibility amongst practitioners

_____ Detailed standards should have associated To_?_ support. Excessive clerical work is the most significant complaint against standards

57] _____ Software Qu_?_ Con_?_ are the steps taken to ensure that the software products are designed and produced to meet or exceed customer requirements and expectations.

58] According to the slides, there are two approaches to Quality Control. They are

_____ Quality Rev_?_

_____ Aut_?_ Software Assessment and software measurement

59] _____ _____ The Software Qua_?_
Pla_?_ sets out the desired product qualities and how these are assessed and defines the most significant quality attributes; it should set out which organizational standards should be applied and, if necessary, define new standards

60] _____ Software
measurement is concerned with deriving a Num_?_ value for an attribute of a software product or process. This allows for objective comparisons between techniques and processes.

61] _____ Software Met_?_
assume that a software property can be measured; they assume that the relationship exists between what we can measure and what we want to know

62] _____ Software Metrics
assume that the relationship exists between what we can measure and what we want to know has been formalized and Val_?_; it may be difficult to relate what can be measured to desirable quality attributes

63] _____ Mai_?_ is a system
attribute which is concerned with (1) the ease of repairing the system after a failure has been discovered and (2) changing the system to include new features

64] _____ Sur_?_ is a system
attribute which is concerned with the ability of a system to continue to deliver its services to users in the face of deliberate or accidental attack

65] _____ Survivability
includes the notion of Resilience. Resilience is the ability of a system to Con_?_ in operation in spite of component failures

64] S_____ S_?_ is a system
attribute which is concerned with the ability of a system to continue to deliver its services to users in the face of deliberate or accidental attack

65] C_____ Survivability
includes the notion of Resilience. Resilience is the ability of a system to C_?_ in operation in spite of component failures

66] The slides list two reasons why Dependability Costs tend to increase exponentially as increasing levels of dependability are required. List them.

_____ More Expensive
D_?_ techniques and hardware that are required to achieve the higher levels of dependability

_____ The Increased
Testing & System V_?_ that is required to convince the system client that the required levels of dependability have been achieved

67] _____ The Man-Month
Myth → If a project is running late, you can _?_

68] _____ Brooke's Law →
Adding people to a late project _?_.

69] _____ Chameleon Myth →
Changing requirements can be easily accommodated at any _?_.

70] _____ Maintenance Myth
→ Once a program is written and it works _?_.

71] _____ {Reliability,
Availability} is the probability that a system, at a point in time, will be operational and able to deliver the requested

services.

72] _____{T/F} Removing X% of the faults in a system will not necessarily improve the reliability by X%.

73] _____{T/F} A program, with known faults, can still be seen as reliable by its users.

74] S_____ S_?_ is a property of a system that reflects the system's ability to operate, normally or abnormally, without danger of causing human injury or death and without damage to the system's environment

75] Discuss The Difference Between "Hazard Avoidance" & "Hazard Detection & Removal"

_____

_____

76] _____ {Reliability, Availability} is the probability of failure-free system operation over a specified time in a given environment for a given purpose.

77] _____ When attempting to achieve Safety, "Hazard Avoidance" is designing the system so that some type of hazard simply c_?_ arise..

78] _____ When attempting to achieve Safety, "Hazard Detection & Removal" is designing the system so that hazards are Det _?_ and Rem_?_ before they result in an accident.

79] _____ When attempting to achieve Safety, what is "Damage Limitation"? Designing the system with features that minimize the damage that may result from an Acc_?_.

80] _____ Why are accidents in complex systems so hard to anticipate and correct? Almost All Accidents are a result of Com_?_ of malfunctions.

81] _____ Howard Newton says "People forget how fast you did a job – but they always remember how W _?_ you D_?_ it".

82] The 4 Major Software Quality Costs Associated Prevention are

_____ Q_?_ Planning

T_____ Formal T_?_ R_?_

E_____ Test E_?_

_____ T_?_

83] The 3 Major Software Quality Costs Associated Internal Failure are

_____ Rew_?_

_____ Rep_?_

_____ Fai_?_ Mode Analysis

84]   The 4 Major Software Quality Prevention Costs are

_____ Com_?_ Resolution

_____ Product Return and Rep_?_

_____ War_?_ Work

_____ He_?_ Line Support

85]   According to the slides, quality plans should be short, succinct documents; if they are too long, no one will read them. According to the slides, there should be 5 things in Quality Plan. List them.

_____ Product Int_?_

_____ Product Pla_?_

_____ Pro_?_ Descriptions

_____ Qua_?_ Goals

_____ Risks and Risk Man_?_

86]   _____ Software Saf_?_ is a software quality assurance activity that focuses on the identification and assessment of potential hazards that may affect software negatively and cause an entire system to fail..

87] The slides provide three recommendations to assure data collection accuracy. List them.

_____ Don't collect Unn_?_ data

_____ Tell people Wh_?_ the data is being collected; it should not be part of personnel evaluation

_____ Don't Rely on Mem_?_ ; collect data when it is generated not after a project has finished

88]   One of the Measurement Surprises is that reducing the number of faults in a program leads to an increased number of help desk calls. Why is that?

_____

_____

_____

_____

89-90]   The slides describe 6 documentation standards. List them.

_____ Documentation Pro_?_ Standards → How documents should be developed, validated and maintained

_____ Document Sta_?_ → Concerned with document contents, structure, and appearance

_____ Document Ide_?_ Standards → How documents are uniquely identified

_____ Document Str_?_
Standards → Standard structure for project documents

_____ Document Pre_?_
Standards → Define fonts and styles, use of logos, etc.

_____ Document Upd_?_
Standards → Define how changes from previous versions are reflected in a document

91] _____ Software Dep_?_ is
the extent to which a critical system is trusted by its users

92] _____ For Critical
Systems, it is usually the case that the most important system property is the Dep_?_ of the system; this reflects the user's degree of trust in that system.

93] _____ {T/F} Usefulness & Trustworthiness are not the same thing; A system does not have to be trusted to be useful.

94] _____ {T/F} According to the slides, software complexity can be reduced and eliminated

95] _____ Software is
inherently Com_? because the number of execution paths grow exponentially with size.

96] _____ Software complexity
can be reduced, but not Eli_?_

97] _____ Software complexity
intensifies when one person cannot understand a project in its Ent_?_.

98] _____ Software complexity
complicates Mai_?_.

99] _____ Software
complexity makes it impossible to test each and every Pa_?_ through a module.

99] _____ Software
complexity makes _?_ more difficult to attain.

100] _____ Mai_?_ is a system
attribute which is concerned with the ease of repairing the system after a failure has been discovered.

101] _____ Software Sur_?_ is
a system attribute which is concerned with the ability of a system to continue to deliver its services to users in the face of deliberate or accidental attack.
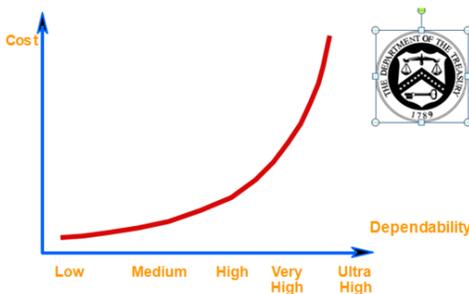
102] _____ Summarize the
findings illustrated in the graph above. Dependability costs tend to increase E _?_ as increasing levels of DEPENDABILITY are required.

103] _____ {Reliability/Safety}
is concerned with conformance to a given specification and delivery of service.

104] _____ {Reliability/Safety}
is concerned with ensuring system cannot cause damage irrespective of whether
or not it conforms to its specification.

105] _____ {T/F} According to the slides, accidents in complex systems rarely have a single cause as these systems are
designed to be resilient to a single point of failure.

106] _____ {T/F} According to the slides, almost all accidents are a result of combinations of malfunctions.

107] _____ Se_?_ is becoming
increasingly important as systems are networked so that external access to the system through the Internet is
possible.

108] _____ Which of the following security terms may be defined is appropriate for "is an exploitation of a system
vulnerability"   A) Exposure   B) Vulnerability   C) Attack   D) Threat   E) Control

109] _____ Which of the following security terms may be defined is appropriate for "exposure is the possible loss or
harm in a computing system
A) Exposure   B) Vulnerability   C) Attack   D) Threat   E) Control

110] _____ Which of the following security terms may be defined is appropriate for "protective measure that
reduces a system vulnerability"
A) Exposure   B) Vulnerability   C) Attack   D) Threat   E) Control

111] _____ Which of the following security terms may be defined is appropriate for "is circumstances that have the
potential to cause loss or harm"
A) Exposure   B) Vulnerability   C) Attack   D) Threat   E) Control

112] _____ Which of the following security terms may be defined is appropriate for "is a computer-based system that
may be exploited to cause loss or harm.
A) Exposure   B) Vulnerability   C) Attack   D) Threat   E) Control

113] _____ The slides specify three types of damage from insecurity. Which of them is → Information that is managed
by the
system may be exposed to people who are not authorized to read or use that information
A) Denial of Service   B) Corruption of Programs or Data   C) Disclosure of Confidential Information

114] _____ The slides specify three types of damage from insecurity. Which of them is → The programs or data in the
system may be modified in an unauthorized way
A) Denial of Service   B) Corruption of Programs or Data   C) Disclosure of Confidential Information

115] _____ The slides specify three types of damage from insecurity. Which of them is → The system is forced into a
state where normal services are unavailable or where service provision is significantly degraded
A) Denial of Service   B) Corruption of Programs or Data   C) Disclosure of Confidential Information

116] _____ The further into the
development cycle one goes before discovering a defect, the more it Co_?_ to fix it.

117] _____ It costs significantly
more to correct the error once it has been installed than it does if the error is found at the Req_?_ stag

118] _____   _____ The SQA Group
records any noncompliance and reports to Sen_?_ Man_?_. Noncompliance items are tracked until they are
resolved.

119] _____ Software complexity makes Qua_?_ more difficult to attain.

120-130] Put initials at top of each and every page. Staple this homework. Fold in half length-wise. Put Name On Outside.