

## Practice Exam Notes

- The real final exam will have similar multiple-choice questions in terms of both format and content covered but they will not be identical to the questions in this document.
- The final exam will also have a short answer section. The short answers questions will be similar to the in-class activities (e.g. making UML diagrams, use cases, calculating cyclomatic complexity, JavaDoc, JUnit, etc.).

## Part I: Multiple Choice

**Circle the BEST answer. If more than one answer makes sense, pick the BEST one.**

- 1) From the following which would be the BEST definition to explain software?
  - A. Software is something tangible and can be used in a system.
  - B. **Software is a logical element of the system.**
  - C. Software is both a logical and physical element of the system.
  - D. Software is a physical element of the system.
- 2) Which of the following is NOT a reason we spend so much time and effort maintaining existing programs:
  - A. Errors in delivered software must be corrected.
  - B. Changes to technical standards, operating systems, etc. cause new or unexpected errors that need to be corrected.
  - C. Poor documentation takes longer to reverse engineer and fix.
  - D. Poor useability or user level documentation; must provide additional support to users.
  - E. **Development tools do not work as expected.**
- 3) Which of the following is **NOT** a category of the seven software application domains?
  - A. System software
  - B. Web/Mobile applications
  - C. **Tertiary software**
  - D. Embedded software
  - E. Artificial Intelligence Software

- 4) Application software includes applications such as:
- A. Microsoft Word, Photoshop, and Minecraft (video game).
  - B. Matlab, Autocad, and PSpice.
  - C. Windows, Linux, compilers.
  - D. YouTube, OWL, TikTok
  - E. Self-driving cars, image recognition, decision making systems.
- 5) The Software Engineering Layer “Methods” describes:
- A. The technical “how-to’s” for building software.
  - B. The tools that aid in automation and support of software engineering processes.
  - C. The foundational Layer of software engineering and holds everything together.
  - D. A commitment to quality.
  - E. Methods for unit testing software.
- 6) Fill in the blanks. The following \_\_\_\_\_ resides within a product or system.
- A. Embedded software
  - B. System software
  - C. Application software
  - D. Product-line software
- 7) A task in the generic process framework can best be defined as:
- A. a collection of activities and actions that are performed when some work product is to be created.
  - B. strives to achieve a broad objective and is applied regardless of the application domain, size, complexity, etc.
  - C. focusing on small, but well-defined objectives that produces a tangible outcome.
  - D. encompasses a set of tasks that produce a major work product.
  - E. the review process of evaluating various software engineering work products.
- 8) Which one of the following is **NOT** an Umbrella Activity:
- A. Software project tracking and control
  - B. Deployment
  - C. Risk management
  - D. Technical reviews
  - E. Measurement
- 9) George Polya outlined the essence of software engineering practice as:

- A. Plan a solution that includes modeling and software design.
- B. Understand the problem, plan a solution, carry out the plan, and examine the result for accuracy.
- C. Understand the problem, plan a solution, and carry out the plan.
- D. Understand the problem including the communication and analysis.

10) The five key software process activities are always performed in the same order and linearly.

- A. True
- B. False



11) The above diagram depicts this software process flow:

- A. Linear Process Flow
- B. Iterative Process Flow
- C. Evolutionary Process Flow
- D. Parallel Process Flow
- E. Spiral Process Flow

12) Which of the following is a possible stakeholder group for the OWL Migration project discussed in-class:

- A. Medical doctors at sick kids in Toronto.
- B. The city of London Ontario.
- C. The government of Ontario.
- D. Parks Canada
- E. Western University students and faculty.

13) In what way does the unified process model differ from other models?

- A. The unified process begins by describing the customer's interaction with the system.
- B. The unified process provides a graphical representation of the system to be designed.
- C. The unified process recognizes the importance of customer communication and streamlined methods for describing the customer's view of a system.
- D. The unified process allows for easy understanding of the different transition stages within the system.

14) From the following which BEST explains the term “process flow”?

- A. Describes how the framework activities and the actions and tasks that occur within each framework activity are organized with respect to sequence and time.
- B. Describes the execution of one or more activities in parallel with other activities.
- C. Describes how activities repeat before proceeding to the next.
- D. Describes the execution of each of the five framework activities in sequence, beginning with communication and culminating with deployment.

15) Which of the following is a Prescriptive Process Model:

- A. Scrum Model
- B. XP Model
- C. DevOps Model
- D. V-Model
- E. Evolutionary Process Flow

16) An issue with the Prototyping Process Model is that:

- A. Temptation to “ship” a prototype.
- B. Testing occurs late in the process.
- C. It is essentially the same as the waterfall model.
- D. Overlapping phases can cause problems.
- E. It does not accommodate change well.

- 17) What is the main purpose of a daily scrum meeting?
- A. The daily scrum meeting allows the stakeholder to try the current daily build and give feedback.
  - B. The daily scrum meeting allows for discussions on technical problems found since the last team meeting.
  - C. The daily scrum meeting allows the workflow to be synchronized and make plans for the next 24 hours.
  - D. The daily scrum meeting asks what items will be added to the backlog.
- 18) Within a scrum, a sprint is a short time-boxed period of time. Which of the following would you classify as a “sprint”?
- A. Work that has been running at an even pace but then finishes quickly at the end.
  - B. Work that takes place within a relatively short time frame.
  - C. Work that starts off fast, as in a sprint, but then slows down to a steady pace.
  - D. Work that races along quickly to a given point irrespective of whether it gets finished.
- 19) An issue with the DevOps methodology is that:
- A. It is difficult to control the cost of changes.
  - B. Temptation to “ship” a prototype.
  - C. Developer reluctance to use measurement.
  - D. Heavy reliance on automated tools to be effective.
- 20) Which of the following would describe the meaning of a scrum team in software development?
- A. A scrum team is an independent SQA team and conducts tests and quality assurance activities on an active software development project.
  - B. A scrum team is a loose team of people that can come and go in the development stage and often have no formal project title.
  - C. A scrum team is a self-organizing interdisciplinary team consisting of a product owner, a scrum master, and a small development team.
  - D. A scrum team is a group of stakeholders invested in the product.

21) Which of the following is a positive for using scrum?

- A. Owner sets priorities.
- B. Suitable for large teams.
- C. Expert team members.
- D. Cost control of changes.

22) Scrum principles are used to guide development activities within a process that incorporates the following framework activities:

- A. Requirements, analysis, design, evolution, delivery.
- B. Proposal, evolution, analysis, delivery
- C. Design, requirements, evolution, distribution
- D. Requirements, analysis, evolution, delivery

23) The XP framework encourages the use of:

- A. A board that shows all project tasks.
- B. Pair programming.
- C. Continuous integration.
- D. Daily, weekly, and monthly meetings.

24) This type of maintenance deals with keeping software usable in a changing environment:

- A. Corrective maintenance
- B. Adaptive maintenance
- C. Perfective maintenance
- D. Preventive maintenance
- E. Scope maintenance

25) Which of the following would NOT be considered an essential part of the Go No Go Decision making to continue with the prototype development?

- A. The project risk of exceeding its budget becomes high.
- B. The project must be delivered at any cost.
- C. The risk of the project failing to meet its target objectives.
- D. The risk of missing the delivery date.

- 26) Which of the following is NOT a key principle for communication?
- A. If something is unclear, draw a picture.
  - B. **Ensure all meetings are at least 30 minutes long.**
  - C. Face-to-face communication is best.
  - D. Prepare before you communicate.
  - E. Someone should facilitate the activity.
- 27) What are primary actors?
- A. Primary actors are considered more important than secondary actors.
  - B. Primary actors are any stakeholder of the system.
  - C. Primary actors are only human.
  - D. Primary actors support the system so that secondary actors can do their work.
  - E. **Primary actors are any person or system external to the system who provides input/output.**
- 28) An example of a Non-Functional Requirement would be:
- A. **The user interface must be intuitive and easy to use.**
  - B. The Sales system should allow users to record customers sales.
  - C. The system must support multiple users and allow them to login to the application via a login screen.
  - D. Users can create bookmarks of their favorite webpages.
  - E. The system sends an approval request after the user enters personal information.
- 29) Which of the following is NOT a requirements engineering task?
- A. **Architectural design**
  - B. Inception
  - C. Specification
  - D. Validation
  - E. Elaboration
- 30) This requirements monitoring task uncovers errors and determines their cause:
- A. **Distributed debugging**
  - B. Run-time verification
  - C. Run-time validation
  - D. Business activity monitoring
  - E. Evolution and codesign

31) This conflict resolution technique asks all stakeholders involved with the conflict itself to vote on a set of alternative options.

- A. Agreement
- B. Compromise
- C. Overruling
- D. Voting
- E. Stakeholder determinism

32) Which of the following is NOT part of the requirements models?

- A. Class-oriented models
- B. Behavioural models
- C. Flow-oriented models
- D. Interactive models
- E. Data models

33) CRC cards are used in this kind of modeling:

- A. Data modeling.
- B. Flow modeling.
- C. Events modeling.
- D. User interface modeling.
- E. Class modeling.

34) When performing a grammatical parse to develop Analysis Classes, nouns become potential:

- A. Methods
- B. Interfaces
- C. Attributes
- D. Classes
- E. Packages

35) This diagram can be used for scenario modeling:



- A. UML Class diagram.
- B. UML Use Case diagram.
- C. Entity Relationship Diagram (ERD).
- D. UML State Diagrams.
- E. Data Flow Diagram (DFD).

36) Good software design should exhibit:

- A. High coupling, High cohesion.
- B. Low coupling, High cohesion.
- C. Low coupling, Low cohesion.
- D. High coupling, Low cohesion.

37) At the lowest level of \_\_\_\_\_ a solution is stated in specific terms using pseudocode.

- A. Modularity
- B. Architecture
- C. Refactoring
- D. Abstraction
- E. Coupling

38) Technical Debt is best described as:

- A. Costs associated with rework caused by choosing “quick and dirty” solution.
- B. Unpaid wages to technical workers.
- C. Costs associated with purchasing hardware and software for the development team.
- D. Costs associated with not maintaining hardware that supports the development team.
- E. Payments owing on loans taken out to fund development.

39) Work products from the design activity act as a blueprint for this activity:

- A. Communication
- B. Planning
- C. Deployment
- D. Construction
- E. Maintenance

- 40) The design concept is a top-down design strategy originally proposed by Niklaus Wirth to successively refining levels of procedural detail.
- A. Functional Independence
  - B. Stepwise Refinement
  - C. Abstraction
  - D. Refactoring
  - E. Information Hiding
- 41) This form of UML deployment diagram shows the computing environment but does not explicitly indicate configuration details:
- A. Descriptor form.
  - B. Instance form.
  - C. Configuration form.
  - D. Design form.
  - E. Hardware form.
- 42) In the Process-Related View, a software component is a:
- A. A method or operation.
  - B. A set of one or more classes.
  - C. A pre-existing prepackaged design pattern.
  - D. A class attribute or field.
  - E. The package that contains the whole software project.
- 43) In this architectural style A data store resides at the center of the architecture, accessed frequently by other components that update, add, delete, or otherwise modify data in the store.
- A. Data-Centered
  - B. Call-and-Return
  - C. Layered
  - D. Data-Flow
  - E. Model-View-Controller
- 44) This architectural consideration implies that a system is consistent and balanced in its attributes.

- A. Visibility
- B. Spacing
- C. Symmetry
- D. Emergence
- E. Economy

45) This type of diagram is BEST used to represent architectural context:

- A. UML Context diagram.
- B. Architectural Component Deployment Diagram (ACDD).
- C. Architectural Activity Figure (AAF).
- D. Entity-Relationship Diagram (ERD).
- E. Architectural Context Diagram (ACD).

46) This basic design principle states that “depend on abstractions. Do not depend on concretions.”:

- A. Open-Closed Principle (OCP)
- B. Interface Segregation Principle (ISP)
- C. Dependency Inversion Principle (DIP)
- D. Liskov Substitution Principle (LSP)
- E. Common Closure Principle (CCP)

47) This basic design principle states that “a module should be open for extension but closed for modification.”

- A. Open-Closed Principle (OCP)
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- C. Dependency Inversion Principle (DIP)
- D. Liskov Substitution Principle (LSP)
- E. Common Closure Principle (CCP)

48) This type of coupling occurs when one component “surreptitiously” modifies data that is internal to another component:

- A. Content
- B. Control
- C. External
- D. Internal
- E. Data

49) A common work product of UX design is:

- A. Color palettes
- B. Type setting
- C. Visual design
- D. Wireframes

50) This user experience design element is comprised of three components: information design, interface design, navigation design.

- A. Strategy
- B. Scope
- C. Structure
- D. Skeleton
- E. Surface

51) The video game marketplace Steam having an inconsistent user interface breaks this golden rule:

- A. Reduce the user's memory load.
- B. Make the interface consistent.
- C. Place the user in control.
- D. Make the design attractive.
- E. Provide for flexible interaction.

52) User personas are:

- A. Descriptions of real end users.
- B. Created for every user.
- C. Aid in software testing.
- D. Used to create scenarios for target users.

53) This task analysis and modeling action defines how a work process is completed when several people are involved.

- A. Task elaboration
- B. Object elaboration
- C. Workflow analysis
- D. Use case creation
- E. User profiling

- 54) In Google's 5-Day UX design sprint, on the sketch day:
- A. Lightning talks are given by domain experts.
  - B. Individual team members (including stakeholders) are given the time and space needed to brainstorm solutions.
  - C. A Minimally viable product based on the solution selected from the sketch phase is created.
  - D. Each stakeholder presents his solution sketch and the team votes to determine the solutions that should be tackled in the prototyping phase.
  - E. Developers watch users try out the prototype.
- 55) Number of actions, tasks, and system states indicated by the design model give an indication of:
- A. the size of the finished software in gigabytes
  - B. the complexity of the interface and the degree to which it will be accepted by the user
  - C. the memory load on users of the system
  - D. the amount of learning required by users
  - E. the interaction time and the overall efficiency of the system
- 56) This useability guideline states that "A well-designed interface provides the illusion that users are in the same place, with the work brought to them".
- A. Anticipation
  - B. Controlled Autonomy
  - C. Visible Navigation
  - D. Learnability
  - E. Focus
- 57) The windows calculator application implementing a user interface that is visually similar to a physical calculator is an example of this useability guideline:
- A. Consistency
  - B. Human Interface Objects
  - C. Learnability
  - D. Metaphors
  - E. Readability

58) Which of the following is NOT a category of design pattern?

- A. Component Patterns
- B. Mobile Patterns
- C. Object-Oriented Patterns
- D. Data patterns
- E. Application patterns

59) Which of the following subcategory of patterns BEST matches the following explanation: Address problems associated with the assignment of responsibility between objects and the manner in which communication is affected between objects.

- A. Structural patterns
- B. Behavioural patterns
- C. Interface patterns
- D. Creational patterns

60) Fill in the blank. A \_\_\_\_\_ encompasses a collection of patterns, each described using a standardized template and interrelated to show how these patterns collaborate to solve problems across an application domain.

- A. Pattern language
- B. Collaboration language
- C. Broad task
- D. Design task

61) This part of the pattern template describes the trade-offs that must be considered when the pattern is implemented:

- A. Context
- B. Forces
- C. Intent
- D. Collaborations
- E. Consequences

62) This is an example of an Anti-Pattern:

- A. Abstract factory
- B. Stovepipe System
- C. Container
- D. Chain of responsibility
- E. Adapter pattern

63) Which of the following answers matches the understanding of the value-based view of quality?

- A. Quality is something you immediately recognize but cannot explicitly define.
- B. Quality relates to the original specification of the product.
- C. Quality can be tied to inherent characteristics.
- D. Quality relates to the end user's specific goals.
- E. Quality is based on how much a customer is willing to pay for a product.

64) This ISO 25010 quality model eight characteristics that focus on both the static and dynamic nature of computer systems.

- A. Design quality model
- B. Item quality model
- C. Project quality model
- D. Product quality model

65) The independent video game developer Hello Games faced significant backlash regarding their game No Man's Sky due to:

- A. Following the "good enough" approach to software quality and releasing the game with missing features.
- B. Perfectionism that lead to the game being delayed for years.
- C. Missing the market window, customers were no longer interested in the game.
- D. Including a bug that permanently damaged customer's computers.

66) This quality cost comes from quality planning, formal technical reviews, test equipment, and training.

- A. Prevention Costs

- B. Appraisal Costs
- C. Internal Failure Costs
- D. External Failure Costs
- E. Support Costs

67) How effective have review techniques been in uncovering errors according to the software engineering industry?

- A. Up to 100%
- B. Up to 85%
- C. Up to 50%
- D. Up to 75%

68) The review metric Rework Effort ( $E_r$ ) refers to:

- A. The effort (in person-hours) required to review a work product prior to the actual review meeting.
- B. The effort (in person-hours) that is expended during the actual review.
- C. Represents the sum of effort measures for reviews.
- D. The effort (in person-hours) that is dedicated to the correction of those errors uncovered during the review.

69) The review metric Preparation Effort ( $E_p$ ) refers to:

- A. The effort (in person-hours) that is expended during the actual review.
- B. The effort (in person-hours) required to review a work product prior to the actual review meeting.
- C. Represents the sum of effort measures for reviews.
- D. The effort (in person-hours) that is dedicated to the correction of those errors uncovered during the review.

70) A walkthrough is an example of this type of review:

- A. Formal review.
- B. Informal review.
- C. Casual review.
- D. Obsolete review.



71) Cyclomatic complexity  $V(G)$  for a flow graph  $G$  can be defined as:

- A.  $V(G) = E - N + 2$
- B.  $G = E - N$
- C.  $V(G) = E - N - 2$
- D.  $V = E - 2 + N$

72) How should you test unstructured loops?

- A.  $m$  passes through the loop where  $m < n$ .
- B. Pass through the loop at its bounds  $m$  passes for  $m=0, 1, n-1$ , and  $n$ .
- C. Only one pass through the loop.
- D. Two passes through the loop.
- E. Unstructured loops are commonly a sign of a bigger problem, do not test, refactor instead.

73) This approach to testing uses implementation knowledge of control structures:

- A. White-box testing
- B. Black-box testing
- C. Functional testing
- D. Behavioural testing

74) Which of the following answers BEST describes the goals of a good test?

- A. A good test will be easy to run.
- B. A good test will have a high likelihood of finding errors.
- C. A good test will be simple to understand.
- D. A good test will be quick to get results from.

75) A regression test suite contains three (3) different classes of test cases. Which of the following is NOT part of the test suite?

- A. Additional tests that focus on software functions could be affected by change.
- B. Representative tests samples that exercise all software functions.
- C. Tests that look at how the software engineer is interacting with the software.
- D. Tests that focus on software components that have changed.