Final Exam

1. Which of the following might provide a measure of the usability of a system?

	a.	The number of bugs found by system testers.
	b.	The number of man-months taken to implement a new feature.
	c.	The number of errors made by programmers.
	d.	The number of errors made by users

2. Which of the following area of concern is not addressed in the design model?

	a.	Interfaces to peripheral devices.
	b.	Data structures.
	c.	Interfaces between modules.
	d.	Algorithms
	e.	Relationships among modules.

3. Which of the following does not apply to the waterfall model?

	a.	It is sequential
	b.	It is linear.
	c.	It is rigid.
	d.	It can easily accommodate changes in customer requirments.
	e.	It is better than the code and fix model.

4. Code refactoring may be considered to be an application of the following software engineering principle (pick the one that fits the best):

	a.	Modularity
	b.	Rigor and formality
	c.	Separation of concerns

	d.	Incrementality
	e.	Anticipation of change

5.

Entity-Relationship diagrams (ERDs) are similar in content and purpose to Unified Modeling Language (UML) Class diagrams. Which of the following is not a basic building block of ERDs?

	a.	Relationships
	b.	Attributes
	c.	Associations
	d.	Entities

6.

Car insurance payments are calculated according to the following requirements specifications:

If the client is a female less than 65 years of age, the premium is $500.

If the client is a male less than 25 years of age, the premium is $3000.

If the client is a male between 25 and 64 years of age, the premium is $1000.

If the client is 65 years of age or more, the premium is $1500.

What is the number of test cases necessary to cover all combinations of inputs?

	a.	5
	b.	8
	c.	4
	d.	6
	e.	7

7.

What is Extreme Programming?

	a.	It is a set of software development practices that are aimed to create reliable software using extensive feedback, developer engagement, and small development iterations.
	b.	It is a programming method that involves programming during very long hours.
	c.	It is a programming method that involves searching for very complicated algorithms to solve problems.
	d.	It is a problem-solving process based on investigating hundreds of possibilities before choosing one.

8.

Which of the following is an umbrella software engineering activity?

	a.	Architecture analysis
	b.	Verification
	c.	Requirements specification
	d.	Design specification.
	e.	Feasibility Study.

9.

Which design model is analogous to the floor plan of a house?

	a.	Architectural design
	b.	Interface design
	c.	Data design
	d.	Component-level design

10.

Which of the following is NOT a useful question to ask when discovering the actors of a system?

	a.	Users who startup and shutdown the system.
	b.	Users who consume information from the system.

	c.	Users who provide information to the system.
	d.	Whether users are required to login and authenticate themselves to the system.
	e.	Users who login and logout of the system.

11.

Which of the following properties does not correspond to a good Software Requirements Specification?

	a.	Complete
	b.	Traceable
	c.	Verifiable
	d.	Ambiguous

12.

Which of the following is not a component of software engineering?

	a.	Process
	b.	Tools
	c.	Manufacturing
	d.	Methods

13.

Which of the following software process models insists on understanding user requirements before any coding and software development begins?

	a.	Evolutionary model
	b.	Waterfall model
	c.	Spiral model
	d.	Transformation model
	e.	Agile model

14.

Static analysis cannot find:

	a.	Array bound violations.
	b.	Incompatible assignments.
	c.	The use of a variable before it has been defined.
	d.	The re-definition of a variable before it has been used.
	e.	Whether the value stored in a variable is correct.

15.

Which of the following statements is not true about delegation?

	a.	Delegation models "has-a" relationship.
	b.	Delegation eliminates unneeded functionality.
	c.	Delegation is a way to implement multiple inheritance.
	d.	Delegation is faster than inheritance.
	e.	Delegation promotes black-box reuse.

16.

Testing is not done to _____

	a.	Improve quality
	b.	Check user-friendliness
	c.	Improve software accuracy
	d.	Find faults

17.

In a flight reservation system, the number of available seats in each plane model is an input. A plane may have any number of available seats (the number of available seats must be greater than zero), up to the given capacity of the plane. Using boundary value analysis, a list of available seat values were generated. Which of the following lists is correct?

	a.	1, 2, capacity -1, capacity, capacity + 1
	b.	0, 1, 100, capacity, capacity + 1
	c.	0, 1, capacity, capacity + 1
	d.	0, 1, 2, capacity + 1, a very large number

18.

Which of the following is NOT a software engineering principle?

	a.	Modularity
	b.	Avoidance of Change
	c.	Incrementality
	d.	Separation of Concerns
	e.	Rigor & Formality

19.

Consider the situation:

Every restaurant has at least one kitchen, one kitchen is part of exactly one restaurant.

What is the cardinality of the relationship between entities restaurant and kitchen?

	A.	Many to Many
	B.	One to One
	C.	Many to One
	D.	One to Many

20.

Non-functional system testing involves:

	a.	Testing that the existing functionality does not break after fixing a fault or implementing a new feature.

	b.	Testing to see where the system does not function correctly.
	c.	Testing quality attributes of the system such as performance and usability.
	d.	Testing a system function using only the software required for that function.
	e.	Testing for functions that should not exist.

21.

Regression testing should be performed:

	a.	After the software/environment has changed.
	b.	Every week
	c.	As often as possible.
	d.	When the project manager says.

22.

Design notation is used to represent relationships among classes. Consider a design notation where -> represents an inheritance relationship. That is, mammal -> bat indicates that bat inherits from mammal, or mammal is a base/parent class and bat is a child/sub-class. Which one of the following notations represent multiple inheritance?

	a.	A -> B, A -> C
	b.	A -> C, B -> C
	c.	B -> A
	d.	A -> B -> C
	e.	C -> A, C -> B

23.

Transforming a software program to a program product involves:

	a.	Operating in a complex hardware and software environment.
	b.	Interfacing with other programs

	c.	Nine times more effort
	d.	Six times more effort.
	e.	Documenting for users of varying ability.

24.

The work associated with software engineering can be categorized into three generic phases, regardless of application area, project size, or complexity namely the_____ phase which focuses on what, the_____ phase which focuses on how and the_____ phase which focuses on change.

i) Maintenance

ii) Development

iii) Specification

	a.	3, 1, 2
	b.	3, 2, 1
	c.	1, 2, 3
	d.	2, 1, 3

25.

Method overloading means that:

	a.	the method may be used on different platforms, such as a server or client computer.
	b.	the same method may be defined more than once in a given class.
	c.	the same method may be defined differently in inherited classes.
	d.	the method may have parameters passed to it from more than one relating class.

26.

Which diagram would you choose to represent the following:

We want to show the functions of the system available to the user.

	a.	Collaboration diagram
	b.	Sequence diagram
	c.	Petri net
	d.	Use case diagram
	e.	Class diagram

27.

Which of the following is NOT an architectural conflict (an architectural conflict considers tradeoff among multiple quality attributes)?

	a.	Localizing safety-related features usually means more communication which results in degraded performance.
	b.	Introducing redundant data improves availability but makes security more difficult.
	c.	Encrypting data leads to better security but the extra processing can degrade performance.
	d.	Placement of GUI components to improve usability.
	e.	Using large-grained components improves performance but reduces maintainability.

28.

Which one of the following are static elements in an FSM?

	a.	State transitions
	b.	States and state transitions
	c.	Input and output
	d.	States, input and output.

29.

Which design model is analogous to a set of detailed drawings for each room in a house?

	a.	Architecture design

	b.	Interface design
	c.	Data design
	d.	Component-level design

30.

User requirements are expressed as _____ in agile software development process.

	a.	Use cases
	b.	Functions
	c.	Implementation tasks
	d.	User stories

31.

Which of the following practice hinders software maintainability?

	a.	The design and code are built with an eye towards change.
	b.	The code does not follow the principle of information hiding.
	c.	The developed program code and sync are kept in sync.
	d.	The design and program code are well-documented.

32.

Which of the following best reflects one of the values of the Agile Manifesto?

	a.	Developers should use unit testing tools to support the testing process.
	b.	Adopting plans to change adds no real value to an agile project.
	c.	Working software allows the customer to provide rapid feedback to the developer.
	d.	Business representatives should provide a backlog of user stories and their estimates to the team.

33.

What is Pair Programming?

	a.	It is a programming process, wherein a programmer writes the program twice just in case.
	b.	A development method, where two developers work together at the same workstation.
	c.	It is an algorithm that finds pairs of numbers in a given set of integres.
	d.	It is a way of rectifying errors by considering them in groups of two.

34.

Which of the following is NOT a valid use case for ATM software?

	a.	Transfer money
	b.	Login
	c.	Deposit money
	d.	Withdraw money

35.

Car insurance payments are calculated according to the following requirements specifications:

If the client is a female less than 65 years of age, the premium is $500.

If the client is a male less than 25 years of age, the premium is $3000.

If the client is a male between 25 and 64 years of age, the premium is $1000.

If the client is 65 years of age or more, the premium is $1500.

How many causes and effects does the above specification have? Recall, causes is the number of distinct inputs the program can receive, and effects is the number of distinct outputs the program can produce.

	a.	Causes: 4, Effects: 4
	b.	Causes: 20, Effects: 4
	c.	Causes: 5, Effects: 5

	d.	Causes: 5, Effects: 4
	e.	Causes: 4, Effects: 5

36.

Interface errors occur when there is a mismatch of expectations between the services provided by a module, and its clients. Interface errors are usually discovered during integration testing. Which of the following is an example of interface error?

	a.	Two components exchanging data, one component uses metric units and the other one uses imperial units.
	b.	Under high load, the system does not produce output in a reasonable time.
	c.	The system is difficult to use due to a complicated terminal input structure.
	d.	The messages for user input errors are misleading and not helpful to understand causes of input errors.

37.

Which of the following is not true about code refactoring?

	a.	Refactoring makes maintenance easier.
	b.	Refactoring makes it easier to find and fix bugs.
	c.	Refactoring is done in response to a feature request.
	d.	Refactoring improves understandability of the code.

38.

Which of the following is a correct pairing according to the Agile Manifesto?

	a.	Individuals and interactions over processes and tools.
	b.	Individuals and interactions over contract negotiation.
	c.	Individuals and interactions over customer collaboration.
	d.	Individuals and interactions over working software.

39.

A program validates a numeric field as follows:

Values less than 5 are rejected.

Values between 5 and 10 (inclusive) are accepted.

Values greater than or equal to 11 are rejected.

Which of the following is a minimal set of input values cover all of the equivalence partitions?

	a.	4, 5, 10, 21, 22
	b.	4, 5, 10
	c.	4, 5, 10, 11
	d.	3, 8, 13

40.

In order to determine the type that a polymorphic variable refers to, the decision is made

	a.	by the compiler at compile time
	b.	by the user at run time
	c.	by the Java run-time environment at run time
	d.	by the programmer at the time the program is written
	e.	by the operating system when the program is loaded into memory

41.

Software maintenance activities can be grouped into four categories. Code refactoring may be considered which one of the following maintenance activities (pick one that best represents the philosophy of code refactoring)

	a.	Perfective maintenance
	b.	Preventive maintenance
	c.	Adaptive maintenance
	d.	Corrective maintenance

42.

Changes in a software system are inevitable. However, there are some changes that are more desirable than the others. Changes can be classified into local, non-local, and architectural according to their impact. Rank order these three types of changes from the most to the least desirable.

	a.	Local, non-local, architectural
	b.	Architectural, non-local, local
	c.	Local, architectural, non-local
	d.	Architectural, local, non-local
	e.	Non-local, architectural, local

43.

Which of the following statements is incorrect when comparing between inspection and testing?

	a.	Inspection detects faults directly while testing detects faults indirectly via observing failures.
	b.	Inspection is critical in reading and analysis of all software artifacts while testing can only be performed on software source code.
	c.	Inspection can be performed from early on in the software development process while testing can only be performed after the coding phase.
	d.	Testing considers only one input at a time, while inspection considers a group of inputs.
	e.	Inspection is useful in preventing defects, while testing is useful in detecting and reducing defects.

44.

Consider a system that computes the taxes owed by an individual. It computes the tax according to the following rubric:

1. No tax on the first $4000.

2. The next $1500 is taxed at 10%.

3. The next $28000 is taxed at 22%.

4. Any further amount is taxed at 40%

To the nearest dollar, which of these is a valid boundary value test case?

	a.	1500
	b.	28000
	c.	32001
	d.	33501

45.

Which one of the software process models is a meta-model that can be customized to other software process models?

	a.	Spiral model
	b.	Incremental waterfall model
	c.	Transformation model
	d.	Evolutionary model
	e.	Waterfall model

46.

Which of the following does not apply to evolutionary software processes?

	a.	They are iterative in nature.
	b.	They do not soilicit feedback from the customers.
	c.	They can accomodate changing product requirements easily.
	d.	They may need tools to manage complexity.
	e.	They may emphasize user interfaces over product features.

47.

Consider the following scenario:

A teacher interviews a student, and during the interview the teacher always grades the student. This scenario can be modeled with two use cases -- "Conduct Interview" and "Grade Student". What is the relationship between these two use cases?

	a.	Conduct Interview extends Grade Student
	b.	Grade Student Includes Conduct Interview
	c.	Grade Student extends Conduct Interview
	d.	Conduct Interview includes Grade Student

48.

Programmers left alone will often think that the most important task in the development of software is:

	a.	Testing
	b.	Fixing Defects
	c.	Writing Documentation
	d.	Coding

49.

How should work be allocated to team members in an agile project?

	a.	Project leader or manager should delegate tasks to individual team members to push them outside their comfort zone.
	b.	Tasks should be randomly allocated to team members.
	c.	Project leader should perform important tasks themselves.
	d.	Team members should self select tasks.
	e.	Project leader or manager should delegate tasks to individual team members according to their expertize.

50.

Which diagram would you use to model (represent) the situation that only one person at a time may enter through an airport security check?

	a.	Petri net
	b.	Use case diagram

	c.	Collaboration diagram
	d.	ER diagram
	e.	Sequence diagram

51.

The objective of software planning is to:

	a.	Make use of historical project data.
	b.	Enable a manager to make reasonable estimates of cost and schedule.
	c.	Determine the profit margin prior to bidding on a project.
	d.	Convince the customer that a project is feasible.

52.

Which of the following does not apply to agile software development process?

	a.	It is iterative.
	b.	It can accommodate changing user requirements.
	c.	It can accommodate customer feedback.
	d.	It is rigid.
	e.	It is incremental.

53.

Consider the following scenario:

Question: "What type of ticket do you require, single or return?"

IF the customer chooses "return":

Ask: "What rate, Standard or Cheap-Day?"

IF the customer replies "Cheap Day"

Say: That will be $11.20

ELSE

Say: That will be $19.50

ELSE

Say: "That will be $9.75

ENDIF

What is the minimum number of tests that are needed to ensure that all the questions have been asked, all combinations have occurred and all replies are given?

	a.	6
	b.	5
	c.	4
	d.	3

54.

Which of the following changes is not an example of code refactoring?

	a.	Fixing a bug reported by a customer.
	b.	Removing unneeded comments.
	c.	Removing duplicate code.
	d.	Reorganizing classes into inheritance hierarchy.
	e.	Removing unused attributes.

55.

Consider the Patient and MedicalCondition classes in Medical Information System. What is the relationship between the two classes?

	a.	Patient class "Has-A" MedicalCondition class
	b.	MedicalCondition class "Has-A" PatientClass
	c.	Patient class "Is-A" MedicalCondition class

	d.	MedicalCondition class "Is-A" Patient class

56.

Consider a system that computes the taxes owed by an individual. It computes the tax according to the following rubric:

1. No tax on the first $4000.

2. The next $1500 is taxed at 10%.

3. The next $28000 is taxed at 22%.

4. Any further amount is taxed at 40%

Which of these groups of numbers would fall in the same equivalence class?

	a.	4800, 14000, 28000
	b.	5200, 5800, 28000
	c.	5800, 28000, 32000
	d.	28001, 32000, 35000

57.

Which type of testing describes the following situation? You need the system to be tested by some customers to see if it meets their expectations.

	a.	System testing
	b.	Acceptance testing
	c.	Unit testing
	d.	Integration testing
	e.	Regression testing

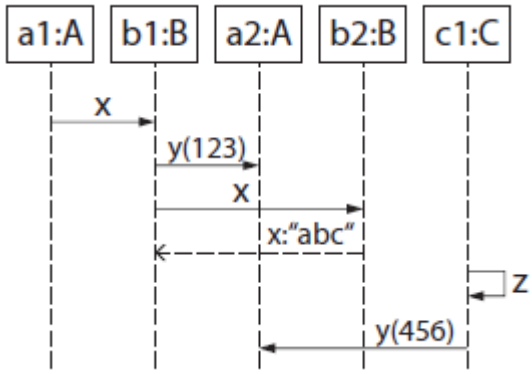
58.

Consider the following USES relationship. A USES B, A USES C, and A USES D. B USES E and D USES F. In the integration testing of this relationship, what scaffolding is necessary?

	a.	Bottom Up: 3 stubs, 2 drivers
	b.	Top Down: 5 stubs, 0 drivers
	c.	Top Down: 0 stubs, 5 drivers
	d.	Bottom Up: 2 stubs, 3 drivers

59.

You are given the following sequence diagram. Which operations does class C have according to the diagram?



	a.	z (): void
	b.	x (): string
	c.	y (): void
	d.	x(void)
	e.	y (int): void

60.

Consider the following scenario:

A mechanic does car service. During that service, it may be necessary to change the break unit.

What is the relationship between the use cases "Car Service" and "Change Break Unit"?

	a.	Car Service Includes Change Break Unit
	b.	Car Service Extends Change Break Unit

	c.	Change Break Unit Extends Car Service
	d.	Change Break Unit Includes Car Service