W06 Prepare: Reading and Quiz

Due May 25 at 11:59pm　　　　**Points** 22　　　　**Questions** 12　　　　**Time Limit** None
Allowed Attempts Unlimited

Instructions

- **Task:** Complete the reading and quiz
- **Purpose:** Critique the quality of a given article and identify the assumptions on which an author's conclusions were made
- **Time:** 120 minutes

Notes

- The Prepare activity for this week will be two lengthy and detailed journal articles.
- **To see more about this item, please click here.**　**(https://content.byui.edu/file/a2001083-4378-4d58-a641-903d8b5bbaa6/1/Prepare/432.06.Prepare.html)**
- Please take the quiz after doing the reading.

<div style="text-align:center">

Take the Quiz Again

</div>

Attempt History

	Attempt	**Time**	**Score**
KEPT	**Attempt 6**	less than 1 minute	20 out of 22
LATEST	**Attempt 6**	less than 1 minute	20 out of 22
	Attempt 5	less than 1 minute	19.5 out of 22
	Attempt 4	3 minutes	19 out of 22
	Attempt 3	less than 1 minute	17 out of 22
	Attempt 2	3 minutes	13 out of 22
	Attempt 1	5 minutes	14.5 out of 22

⚠ Correct answers are hidden.

Score for this attempt: **20** out of 22

Submitted May 25 at 10:03pm

This attempt took less than 1 minute.

Question 1   1 / 1 pts

What problems are formal methods designed to address?

○ The software development process should be more adaptable to change

○ The software development process should be more repeatable and predictable

◉ Many software products result in code that cannot be convincingly demonstrated as correct

○ There are too many bugs in software developed by the currently popular processes

Please re-read Chapter 1.0

Question 2   3 / 3 pts

What difficulties do critics attribute to formal systems? Please select all that apply

☑ Scaling up to large systems

☑ Impracticalities of formalizing user interactions

☑ Impracticalities of formalizing error-checking code

☑ Radical retraining needed for existing software engineers

☐ The extreme amount of time it takes to formalize software

☐ The inefficiencies inherit in spending so much time doing non-software production tasks

☐ The extra testing time required when applying formal methods

Please re-read Chapter 1.0

Question 3   3 / 3 pts

Please write the definition of formal methods as presented in Chapter 2.0 in the pull-quote beginning with "A formal methods in...". Please do not copy-paste this quote, write it verbatim. There is three periods, four commas, an open parentheses, and a close parentheses.

A formal method in software development is a method that provides a formal

Second pull-quote in Chapter 2.0 reading "A formal method in software development is a method that provides a formal language for describing a software artifact (e.g. specifications, designs, source code) such that formal proofs are possible, in principle, about properties of the artifact so expressed."

about properties of the artifact so expressed.

Partial

Question 4   1.5 / 3 pts

Which areas of mathematics overlap the most with the needs of formal methods?

☑ formal logic

☐ propositional calculus

☐ predicate logic

☑ set theory

☑ formal languages

☐ finite state machines

☐ lambda calculus

☐ linear algebra

☐ geometry

Question 5   2 / 2 pts

Which of the following completes the sentence found in the reading:

> "In fact, practitioners of formal methods frequently use formal methods solely for ..."

◉ ... recording precise specifications, not for formal verifications"

○ ... establishing correctness of a design"

○ ... helping testers generate test cases"

○ ... keeping software engineers busy so they do not cause too much trouble with their wild antics"

Question 6   2 / 2 pts

According to the article, what application areas frequently justify the cost of using formal verification methods? Select all that apply.

☑ Safety

☑ Security

☐ Financial

☐ Entertainment

☐ Political

☐ Communication

☐ Military

☐ Academic

Question 7   2 / 2 pts

According to the article, which of the following are true of formal methods?

Select all that apply.

◉ Formal specifications scale much easier than formal verifications

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○

Formal verifications seem to scale up much easier than formal specifications

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○ It is impossible to completely prove even the simplest algorithm

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○ Formal methods are only to be used in academic settings

Partial

Question 8   0.5 / 1 pts

Which of the following best explains this quote:

You cannot go from the informal to the formal by formal means

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☑

You cannot prove that a formal specification captures a user's intuitive informal understanding

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☐

Using formal methods, you can remove detail to make a formal argument informal, but you cannot add detail to make an informal argument formal

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☐

Formal methods can be used to validate a system, but not to verify a system

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☐

It takes intelligence and creativity to turn an informal argument into a formal one. This is only possessed by humans, not but formal algorithms

Question 9

1 / 1 pts

What is the first priority of the cleanroom software engineering methodology?

- ⦿ Defect prevention

- ○ Defect removal

- ○ Statistical certification of quality

- ○ Increased flexibility

Please read page 19 of "Cleanroom Software Engineering"

Question 10

2 / 2 pts

The cleanroom development methodology makes several promises. Select all that apply.

- ☑ It will take no more time to develop software than standard methods

  "Human verification need take no more time than debugging (although it takes place earlier in the cycle)."

- ☑ The number of defects will be smaller

  "A second encouraging trend is the drop in total defect count (by as much as half)."

☐ The speed in which a specification is written will increase

☐ The speed in which software is written will increase

Please read page 20 of the reading.

Question 11 1 / 1 pts

In IBM's experience, what is the net effect on produced code developed using the cleanroom methodology?

◉ Many programs were redesigned to permit simpler verification arguments

This, perhaps, is the greatest benefit: simpler code.

○ Software engineers rekindled their love for discrete mathematics

Question 12 1 / 1 pts

Please locate the paragraph under "Mathematical verification" that begins with "Cleanroom software engineering". This sentence has only one period for punctuation. Please type that sentence verbatim.

Cleanroom software engineering uses mathematical verification to replace pr

The answer is "Cleanroom software engineering uses mathematical verification to replace program debugging before release to statistical testing."

Quiz Score: **20** out of 22