

Program Verification - Quizes

PV-C01-Quiz1

Q1. Which of the followings are not formal verification methods?

- ☐ model checking
- ☐ abstract interpretation
- ☐ number theory
- ☐ type systems

Q2. What are the kinds of program analysis?

- ☐ static & dynamic analysis
- ☐ robust analysis
- ☐ easy-peasy analysis
- ☐ introspect analysis

Q3. How is static analysis of a program performed?

- ☐ while running the program
- ☐ without running the program
- ☐ after the execution of the program
- ☐ none of the above

PV-C02-Quiz1

Q1. Hoare logic

- ☐ assumes termination
- ☐ proves termination
- ☐ implies termination
- ☐ none of the above

Q2. A loop invariant must hold

- ☐ throughout the execution of the loop body
- ☐ between loop iterations
- ☐ never holds
- ☐ none of the above

Q3. Consider the assertions $P = (x > 1)$ and $Q = (x = 7)$. Which of the following is true?

- ☐ P is stronger than Q
- ☐ P is weaker than Q
- ☐ Q is weaker than P
- ☐ P and Q are unrelated

PV-C03-Quiz1

Q1. Which of the followings is true for Weakest Precondition calculus?

- ☐ Given a precondition P , some code C , and postcondition Q , it establishes if the Hoare triple $\{P\} C \{Q\}$ is true.
- ☐ Given some code C and a precondition P , it finds some unique Q which is the weakest postcondition for C and P .
- ☐ Given some code C and a postcondition Q , it finds all P such that the Hoare triple $\{P\} C \{Q\}$ is true.
- ☐ Given some code C and a postcondition Q , it finds the unique P which is the weakest precondition for C and Q .

Q2. What does it mean total correctness?

- ☐ it is equivalent with partial correctness
- ☐ it is equivalent with termination and partial correctness
- ☐ it is equivalent with termination
- ☐ none of the above

Q3. What is the rule for sequences in Weakest Precondition calculus?

- ☐ $wp(C1; C2, Q) \equiv wp(C1, wp(C2, Q))$
- ☐ $wp(C1; C2, Q) \equiv wp(C2, wp(C1, Q))$
- ☐ $wp(C1; C2, Q) \equiv wp(C1, Q)$
- ☐ $wp(C1; C2, Q) \equiv wp(C2, Q)$

PV-C04-Quiz1

Q1. In the Weakest Precondition calculus, finding a loop invariant is

- ☐ easy
- ☐ done in PTIME
- ☐ undecidable
- ☐ done in EXPTIME

Q2. How is a state represented in Separation logic?

- ☐ Store
- ☐ Heap
- ☐ Store x Heap
- ☐ none of the above

Q3. What is aliasing?

- ☐ two different program variables containing the same location
- ☐ two commands with the same semantics
- ☐ when a program variable is recaptured
- ☐ none of the above

PV-C05-Quiz1

Q1. What is a SAT solver?

- ☐ an imperative programming language

- ☐ a program that automatically decides whether a propositional formula is satisfiable
- ☐ a functional programming language
- ☐ an algorithm for computing the CNF of a formula

Q2. Which of the following formulas is in CNF, where \neg stands for negation of a variable?

- ☐ $(p \vee \neg q) \wedge (r / p)$
- ☐ $(p \wedge \neg q) / (r \wedge p)$
- ☐ $p \vee \neg q / (r \wedge p)$
- ☐ none of the above

Q3. Which of the followings is the representation as vectors of vectors of literals for the CNF formula $(x_1 / x_2) \wedge (\neg x_2 / x_3)$, where \neg stands for negation?

- ☐ $[[1,2],[-2,3]]$
- ☐ $[1,2,-2,3]$
- ☐ $[1,2,3]$
- ☐ $[[1,-2],[2,3]]$

PV-C07-Quiz1

Q1. Consider a first-order signature with a constant symbol a , a function symbol f of arity 1, and a predicate symbol P of arity 1. Which of the followings is a term?

- ☐ $P(a)$
- ☐ $f(f(a))$
- ☐ $P(a) \rightarrow f(a)$
- ☐ $f(P(a))$

Q2. Consider a first-order signature with a constant symbol a , a function symbol f of arity 1, and a predicate symbol P of arity 1. Which of the followings is an atomic formula in first-order logic?

- ☐ $P(a)$
- ☐ $f(f(a))$
- ☐ $P(a) \rightarrow f(a)$
- ☐ $P(P(a))$

Q3. Consider a first-order signature with a constant symbol a , a function symbol f of arity 1, and a predicate symbol P of arity 1. Which of the followings is a formula in first-order logic?

- ☐ $P(a) / P(f(a))$
- ☐ $f(f(a))$
- ☐ $P(a) \rightarrow f(a)$
- ☐ $P(P(a))$

PV-C08-Quiz1

Q1. For what can we use the Nelson-Oppen method?

- ☐ to solve the SAT problem
- ☐ for static analysis

- ☐ for combining theory solvers
- ☐ none of the above

Q2. In symbolic execution, at the beginning of the analysis, the path constraint is

- ☐ undefined
- ☐ a random first-order formula
- ☐ the syntactic symbol for true
- ☐ the syntactic symbol for false

Q3. What is concolic execution good for?

- ☐ solving the SAT problem
- ☐ driving the symbolic execution
- ☐ combining theory solvers
- ☐ none of the above