PV-C01-Quiz1

1. Which of the followings are not formal verification methods?
   - [ ] model checking
   - [ ] abstract interpretation
   - [x] number theory
   - [ ] static analysis
   - [ ] type systems
2. What are the kinds of program analysis?
   - [x] static & dynamic analysis
   - [ ] robust analysis
   - [ ] easy-peasy analysis
   - [ ] introspect analysis
3. How is static analysis of a program performed?
   - [ ] while running the program
   - [x] without running the program
   - [ ] after the execution of the program
   - [ ] none of the above

PV-C02-Quiz1

1. Hoare logic
   - [x] assumes termination
   - [ ] proves termination
   - [ ] implies termination
   - [ ] none of the above
2. How is reasoning in Hoare logic done?
   - [x] backwards, from postcondition to precondition
   - [ ] forwards, from precondition to postcondition
   - [ ] one step forward, two steps backwards
   - [ ] none of the above
3. Consider the assertions P = (x > 1) and Q = (x = 7). Which of the following is true?
   - [ ] P is stronger than Q
   - [x] P is weaker than Q
   - [ ] Q is weaker than P
   - [ ] P and Q are unrelated

PV-C03-Quiz1

1. For a Hoare triple of the form {P} C {Q}, which of the followings is false?

- [ ] P is the precondition
- [x] C is a first-order formula
- [ ] Q is the postcondition
- [ ] P is a first-order formula

2. A loop invariant must hold
   - [ ] throughout the execution of the loop body
   - [x] between loop iterations
   - [ ] never holds
   - [ ] none of the above
3. Which of the followings is true?
   - [ ] The loop invariant can automatically be deduced
   - [x] There is no algorithm to find the loop invariant
   - [ ] Loop invariants are always true
   - [ ] If the loop terminates, the loop condition must be true

PV-C04-Quiz1

1. 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.
   - [x] Given some code C and a postcondition Q, it finds the unique P which is the weakest precondition for C and Q.
2. What does it mean total correctness?
   - [ ] it is equivalent with partial correctness
   - [x] it is equivalent with termination and partial correctness
   - [ ] it is equivalent with termination
   - [ ] none of the above
3. What is the rule for sequences in Weakest Precondition calculus?
   - [x] wp(C1; C2,Q) ≡ wp(C1,wp(C2,Q))
   - [ ] wp(C1; C2,Q) ≡ wp(C2,wp(C1,Q))
   - [ ] wp(C1; C2,Q) ≡ wp(C1,Q)
   - [ ] wp(C1; C2,Q) ≡ wp(C2,Q)
4. In the Weakest Precondition calculus, finding a loop invariant is
   - [ ] easy
   - [ ] done in PTIME
   - [x] undecidable
   - [ ] done in EXPTIME

PV-C05-Quiz1

1. How is a state represented in Separation logic?
   - [ ] Store
   - [ ] Heap
   - [x] Store x Heap
   - [ ] none of the above
2. What is aliasing?
   - [x] two different program variables containing the same location
   - [ ] two commands with the same semantics
   - [ ] when a program variable is recaptured
   - [ ] none of the above
3. Which of the following connectives is in separation logic?
   - [x] -
   - [ ] AG
   - [ ] EX
   - [ ] ▢

PV-C06-Quiz1

1. What is a SAT solver?
   - [ ] an imperative programming language
   - [x] a program that automatically decides whether a propositional formula is satisfiable
   - [ ] a functional programming language
   - [ ] an algorithm for computing the CNF of a formula
2. Which of the following formulas is in CNF, where - stands for negation of a variable?
   - [x] (p / -q) /\ (r / p)
   - [ ] (p /\ -q) / (r /\ p)
   - [ ] p / -q / (r /\ p)
   - [ ] none of the above
3. What clause do you obtain after applying the resolution rule for the clauses {x1, x2, x3} and {-x2,x4}, where - stands for negation of a variable?
   - [ ] {x1,x2,x3,-x2,x4}
   - [ ] {x1,x2,x3,x4}
   - [x] {x1,x3,x4}
   - [ ] {x1,x3} and {x4}
4. Which of the followings is the representation as vectors of vectors of literals forthe CNF formula (x1 / x2) /\ (-x2 / x3), where - stands for negation?
   - [x] 1,2],[-2,3
   - [ ] [1,2,-2,3]
   - [ ] [1,2,3]

- [ ] -1,-2],[2,3

PV-C07-Quiz1

1. 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)
   - [x] f(f(a))
   - [ ] P(a) -> f(a)
   - [ ] f(P(a))
2. 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?
   - [x] P(a)
   - [ ] f(f(a))
   - [ ] P(a) -> f(a)
   - [ ] f(P(a))
3. 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?
   - [x] P(a) / P(f(a))
   - [ ] f(f(a))
   - [ ] P(a) -> f(a)
   - [ ] P(P(a))

PV-C08-Quiz1

1. For what can we use the Nelson-Oppen method?
   - [ ] to solve the SAT problem
   - [ ] for static analysis
   - [x] for combining theory solvers
   - [ ] none of the above
2. In symbolic execution, at the beginning of the analysis, the path constraint is
   - [ ] undefined
   - [ ] a random first-order formula
   - [x] the syntactic symbol for true
   - [ ] the syntactic symbol for false
3. What is concolic execution good for?
   - [ ] solving the SAT problem
   - [x] driving the symbolic execution
   - [ ] combining theory solvers
   - [ ] none of the above