Quiz: Wed, 9 Jan 2019

1. Who is the author of the primary textbook for the class?
   (a) Sibelius; (b) Sebesta; (c) Sethi; (d) Stansifer; (e) Scott

2. How many students received an ‘F’ from the instructor recently for reasons of academic misconduct?
   (a) 2; (b) 20; (c) 200; (d) 2,000

3. true / false There will be a short quiz at the beginning of (almost) every class meeting.

4. In a class of 25 computer science seniors, one should expect how many to fail to put their name on the quiz card?
   (a) 0; (b) 5; (c) 10; (d) 25

5. What is the plural of the word octopus?
   (a) octpuses; (b) octopodes; (c) octopi; (d) octpus

Know the meaning of the words analogy, pedantic, paradigm, linguistics, i.a.
Quiz: Fri, 11 Jan 2019

1. Abstraction means
   (a) signification of words or forms; (b) the medium of expression; 
   (c) human-oriented presentation of data; (d) free from convoluted 
   interactions; (e) act of determining essential properties.

2. Arabic is to linguistics as:
   (a) expression::visualization; (b) complexity::abstraction; 
   (c) Python::programming languages; (d) gender::sex.

3. Software engineers need math because:
   (a) computer operations come from mathematics; 
   (b) visualization of data is mathematical; (c) calculus is essential 
   to calculating; (d) software consists of abstract constructs.

4. Sapir-Worf hypothesis 
   (a) learning new programming languages is hard; (b) the medium 
   constrains thought; (c) “don’t repeat yourself” (DRY); (a) all 
   computational models are the same.

5. In the field of programming languages one studies: (a) the 
   writings of Guido van Rossum; (b) expressing computation; 
   (c) visualizing data; (d) the LAMP stack.
1. true / false Frege contributed to the mathematical foundations of the theory of quantification.

2. Which one of the following is not a computational paradigm: (a) logic programming; (b) imperative; (c) categorical; (d) functional.

3. true / false Objects are a distinguishing characteristic of the computational paradigms.

4. The sky does not have a color because: (a) it contradicts physics; (b) the ancient Greeks drank too much (purple) wine; (c) ancient people couldn’t see the sky because of thick (green) foliage; (d) one cannot paint it.

5. Which one of these notational systems do not violate the “arrow of time”? (a) Thai language script; (b) Peano’s notation; (c) Frege’s notation; (d) Incan quipu.
Quiz: Wed, 16 Jan 2019

1. true / false  Declarative programming emphasizes the “how” over the “why.”

2. true / false  HTML is not a general purpose programming language.

3. true / false  FORTRAN can reasonably be considered the first programming language.

4. true / false  Translation to native code can be done by an interactive system.

5. true / false  Translation to native code can be done after execution begins.

6. true / false  ISO stands for the organization officially known as the International Standards Organization.
Quiz: Fri, 18 Jan 2019

1. Ada
2. APL
3. COBOL
4. C
5. FORTRAN
6. Icon
7. Java
8. LISP
9. Pearl
10. Python

A. IBM, J. Backus
B. Augusta Ada Bryon
C. Dahl and Nygaard
D. Ralph Griswold
E. Kenneth Iverson
F. Guido van Rossum
G. John McCarthy
H. Kernighan and Richie
I. Sun, J. Gosling
J. US DoD, G. Hopper
K. US DoD, J. Icbaih
L. Larry Wall
Quiz: Fri, 25 Jan 2019

What formal languages over the alphabet \{a, b, c, d\} do the following regular expression represent? Choose from the formal languages below. (You may choose a letter any number of times.)

1. \(\emptyset^*\)
2. \((a + b)^*\)
3. \((a^*)^*\)
4. \((a + \emptyset)^*\)
5. \(((a \cdot b) + (c \cdot d))\)
6. \((((a \cdot b) + (c \cdot d))^* \cdot c\)
7. \(((a + b) + a^*) \cdot c\)
8. \((a^* + b)^*\)
9. \(((a + b)^* + (a + c)^*))\)

A. \(
B. \{\varepsilon\}
C. \{abcd\}
D. \{ab, cd\}
E. \{a, b, aa, ab, ba, bb, \ldots\} 
F. \{\varepsilon, a, b, aa, ab, ba, bb, \ldots\}
G. \{ac, bc, aac, abc, bac, bbc, \ldots\}
H. \{c, abc, cdc, abcdc, 
\hspace{1cm} cdc\hspace{1cm} dc\hspace{1cm} ababc, \ldots\}
I. none of the above
Quiz: Mon, 28 January 2019

1. true / false Back references can be defined in terms of the primitive regular expressions and, so, are just “macros” or “syntactic sugar.”

2. true / false Regular expressions are great because they are more expressive than other common formalisms.

3. true / false Scanner generators and parser generators are examples of a kind of programs which enable programmers to describe what they want and not how to implement it.

4. true / false Syntax diagrams are equivalent to context-free grammars.

5. If \d is the regular expression for a digit ([0-9]), then the regular expression \d+ \d+? matches what part of 321 3451324?
   (a) 3 3; (b) 3 3451324; (c) 321 3; (d) 321 3451324.

6. What part (if any) of Ab+?cAbcd does the Java regular expression A.+? match?
   (a) no part; (b) Ab; (c) Ab+?; (d) Ab+?cAbcd.
1. When is the RSA project due?

2. Show that the following grammar with non-terminals $S$, $A$, and $I$ is ambiguous:

$$
S \rightarrow A \\
A \rightarrow A \times A \mid I \\
I \rightarrow a \mid b \mid c
$$
1. true / false The propositional formula $A \& B \rightarrow C$ is necessarily true if $B$ is false.

2. true / false Assertions in programs help debugging.
1. true / false The Cherokee script is used in writing FORTRAN programs.

2. true / false Assertions in programs help debugging.

3. What do regular expressions denote?

4. Complete the last two columns of the following truth table.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>F</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td>F</td>
<td>F</td>
<td>F</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>F</td>
<td>T</td>
<td>T</td>
<td>F</td>
</tr>
<tr>
<td>T</td>
<td>T</td>
<td>T</td>
<td>T</td>
</tr>
<tr>
<td>T</td>
<td>T</td>
<td>T</td>
<td>F</td>
</tr>
</tbody>
</table>
1. true / false  An inference rule is a method of asserting the truth of one assertion on the basis of the form of other assertions.

2. true / false  Partial correctness means the program satisfies some of the postconditions.

3. true / false  The state of a computer can be modeled as a function from identifiers to numbers.

4. true / false  In axiomatic semantic we model the boundedness of integers.

5. true / false  A formula of first-order logic can be used to characterize a set of computer states.

6. true / false  “Sue me if my postcondition is false, sue you if my precondition is false.”

7. true / false  Proving that programs terminate is not possible.
1. What does it mean for a Hoare triple \( \{P\} S \{Q\} \) to be true or valid?

2. Suppose that \( \top \) is a formula in first-order logic (FOL) that always is true. What set of program states does it characterize?

3. What two Hoare triples must be true/valid in order to conclude that the following Hoare triple is?

\[
\{ \top \} \text{ if } x > 0 \text{ then } y := x \text{ else } y := -x \{ 0 \leq y \}
\]
Quiz: Fri, 8 Feb 2019

Assuming $x$, $y$, and $z$ are well-formed names/variables, identify which of these things are well-formed Hoare triples, valid Hoare triples, or neither.

1. not / wff HT / valid  \{ x > y \} \ x := 7 \ { x > y \}
2. not / wff HT / valid  \{ 7 = 7 \} \ x := 7 \ { 7 = x \}
3. not / wff HT / valid  \{ 7 \} \ x := 7 \ { x = 7 \}
4. not / wff HT / valid  \{ z = 7 \} \ x := 7 \ { z = 7 \}
5. not / wff HT / valid  \{ 7 = 7 \} \ x := 7 \ { x = 7 \}
6. not / wff HT / valid  \{ 7 + 1 \} \ x := 7 \ { x + 1 \}
7. not / wff HT / valid  \{ \top \} \ x := 7, 8 \ { x = 8 \}
8. not / wff HT / valid  \{ 7 = 7 + 1 \} \ x := 7 \ { x = x + 1 \}
9. not / wff HT / valid  \{ 8 = 8 + 1 \} \ x := x + 1 \ { x = 8 \}
10. not / wff HT / valid  \{ x + 1 = 3 \} \ y := 3; \ x := x + 1 \ { x = y \}