Computer Science
Homework for Chapter 5  Due: 2010/05/05

1. The insertion sort algorithm is an example of an algorithm in which of the following classes?
   A. $\Theta(lg n)$  B. $\Theta(n)$  C. $\Theta(n lg n)$  D. $\Theta(n^2)$

2. The binary search algorithm is an example of an algorithm in which of the following classes?
   A. $\Theta(lg n)$  B. $\Theta(n)$  C. $\Theta(n lg n)$  D. $\Theta(n^2)$

3. Which of the following is not a means of repeating a block of instructions?
   A. Pretest loop  B. Posttest loop  C. Recursion  D. Assignment statement

4. Preconditions, postconditions, and loop invariants are examples of which of the following?
   A. Pseudocode  B. Iterative structures  C. Assertions  D. Recursion

5. Which of the following does not print the same sequence of numbers as the others?
   A. $X \leftarrow 5$
   while $(X < 6)$ do
       (print the value of $X$;  $X \leftarrow X + 1)$
   except $(X > 6)$

6. What sequence of values would be printed if the procedure xxx described below were executed with the value of N being 9?
   procedure xxx (N)
   if $(N < 4)$ then
       (print the value of N;  apply the procedure yyy to the value 7)
   else (apply the procedure yyy to the value 2;  print the value of N)

   procedure yyy (N)
   if $(N < 5)$ then
       (print the value of N;  apply the procedure zzz to the value 6)
   else (apply the procedure zzz to the value 5)

   procedure zzz (N)
   if $(N = 5)$ then
       (print the value 7)
   else (print the value 8)

   A. 2, 7, 8 B. 2, 8, 9 C. 1, 7, 8 D. 3, 7, 9

7. What sequence of numbers would be printed if the following procedure were executed with the value of N being 0?
   procedure xxx (N)
   print the value of N;
   if $(N < 2)$ then
       (apply the procedure xxx to the value $N + 1$)
   else (print the value of N)

   A. 0, 1, 2, 1, 0 B. 0, 1, 1, 0 C. 0, 1, 2, 2, 1, 0 D. 0, 1, 3, 3, 1, 0

8. In the following table, connect the term to each phrase that gives the best description of the term.
   (30%)

<table>
<thead>
<tr>
<th>Term</th>
<th>Descriptive Phrase</th>
</tr>
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<tbody>
<tr>
<td>stepwise refinement</td>
<td>A. The fundamental concept in computer science</td>
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<tr>
<td>proof of correctness</td>
<td>B. A means of saving the result of a computation for future use</td>
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<tr>
<td>loop invariant</td>
<td>C. A means of producing different actions depending on a condition</td>
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<tr>
<td>recursion</td>
<td>D. A divide and conquer approach to problem solving</td>
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<td>pretest loop</td>
<td>E. A statement that is true each time a specific point in a repetitive process is reached</td>
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<td>procedure</td>
<td>F. A program segment isolated as a unit</td>
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<tr>
<td>assignment statement</td>
<td>G. The technique of applying a program segment within itself</td>
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<tr>
<td>if-then-else statement</td>
<td>H. Looks before it leaps</td>
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<tr>
<td>sequential search</td>
<td>I. A formal means of verifying software</td>
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<tr>
<td>algorithm</td>
<td>J. Less efficient than the binary method</td>
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</tbody>
</table>