Quiz 6

The Art of Computer Programming

2 November 2026

Full name: .....

You have 10 minutes to answer this quiz, directly on this sheet of paper. No electronic devices or material of any kind is allowed. Do not forget to add your name above. Every question amounts to 2 points; the quiz is graded out of 10 points.

Questions

Q1. A stack is initially empty. We push 1, push 2, pop, push 3, pop, and pop again. In which order are the three values popped?

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Q2. Circle the (only) correct answer. In a singly linked list of n elements, with a pointer to its first node, which of these operations costs $\Theta(n)$ rather than $\Theta(1)$?

a. Inserting a new element at the front.

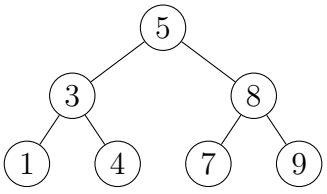
b. Removing the first element.

c. Accessing the element in the middle of the list.

d. Reading the first element.

Q3. We look for the value 7 in the binary search tree below. With which values is 7 compared, in order?

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Q4. Circle the (only) correct answer. A hash table has m buckets and a hash function h. To find out whether a value x is in the table, we look:

a. in every bucket, from the first to the last, until x is found.

b. in the bucket $h(x)$ mod m only.

c. in the bucket x mod m only.

d. in the middle bucket, then in the left or the right half, as in binary search.

Q5. A C++ program is split into `main.cpp`, `stack.h` (which declares the class `Stack` and its method `push`), and `stack.cpp` (which defines them); `main.cpp` includes `stack.h` and calls `push`. We build it in two steps (compiling, then linking),

`g++ -c main.cpp` then `g++ main.o -o stackdemo`

forgetting `stack.cpp` altogether. Circle the (only) correct answer.

a. The first step fails: `Stack` is not declared in `main.cpp`.

b. The first step fails: `Stack::push` is never defined.

c. The first step succeeds and the second fails: `Stack::push` is used in `main.o` but defined nowhere.

d. Both steps succeed, since `stack.h` declares everything `main.cpp` needs.