

CSE 332 Sample Exam Questions

Questions asked on the midterm exam will be similar in style to the following questions that have been asked on previous midterms:

1. (10 points) For each of the following code fragments, please write the letter of the phrase that *best* describes it next to it.

- a. n is initialized with the value 7 `___ int fnc(int n);`
- b. n is assigned the value 7 `___ int n[7];`
- c. n is an array of integers `___ int const * n;`
- d. n is an array of pointers to integers `___ int fnc(int & n);`
- e. n a pointer to a const integer `___ n = 7;`
- f. n is a const pointer to integer `___ int * n[7];`
- g. n is a reference to integer `___ int fnc(int * n);`
- h. n is an integer passed by value `___ int * const n;`
- i. n is an integer passed by reference `___ int n = 7;`
- j. n is an integer pointer passed by value. `___ int & n = p;`

2. (5 points) Please write each of the following words into their correct places in the following sentences.

Makefile precompiler linker editor compiler

The _____ copies the content of header files into the source files, which you created using an _____. The _____ turns those source files into object files that are then combined by the _____ to form an executable program. These steps are managed by inference rules from the _____.

3. (10 points)

Please give two reasons why it is better to catch exceptions by reference than to catch them by value.

Assuming we catch exceptions by reference, why would we put the catch block for a derived class that can be thrown as an exception *before* the catch block for the base class from which it inherits?

4. (5 points) Please explain briefly the problem that is solved by the Singleton design pattern, and how the Singleton pattern solves that problem.

5. (10 points) Given the following class declarations and function definition, what output is produced by a call to function baz ?

```
class A {
public:
    void x () {cout << "A:x" << endl;};
    virtual void y () {cout << "A:y" << endl;};
};

class B : public A {
public:
    void x () {cout << "B:x" << endl;};
    virtual void y () {cout << "B:y" << endl;};
};

void baz () {
    A a;
    B b;
    A *ap = &b;
    B *bp = &b;
    A &ar = b;
    B &br = b;
    ap->x ();
    bp->x ();
    ar.x ();
    br.x ();
    a.y ();
    b.y ();
    ap->y ();
    bp->y ();
    ar.y ();
    br.y ();
    return 0;
};
```

6. (8 points) Please explain briefly (1) what is wrong with the following function implementation and (2) what you would do to fix it:

```
// exchanges values of passed variables
void swap_integers (int i, int j)
{
    int temp = i;
    i = j;
    j = temp;
}
```

7. (5 points) Please circle the letter next to *every one* of the following variables that would be kept in a program's stack memory segment
- a. A member of an object that was created by operator new
 - b. The argc integer variable passed by value to function main
 - c. A temporary variable in the expression $a + b * a$
 - d. A pointer-to-character returned by value from a function
 - e. A static member of an object that was declared inside a function definition
8. (5 points) Please circle each of the following that is *always* a memory management mistake in a C++ program:
- a. returning a reference to a local automatic variable
 - b. dynamic memory allocation
 - c. passing a pointer by reference
 - d. removing the last alias to a chunk of heap memory
 - e. double deletion of an object