

This worksheet is for your use during and after lecture. It will not be collected or graded, but I think you will find it a useful tool as you learn C++ and study for the exams. Explain all false answers for the “True or False” questions; in general, show enough work and provide enough explanation so that this sheet is a useful pre-exam review. I will be happy to review your answers with you during office-hours, via Email, or instant messaging.

1. Write C++ statements to perform the following:

(a) Declare an uninitialized pointer to an `int`.

(b) Use two C++ statements (ending with semicolons) that declare an integer `foo` and a pointer to `foo` named `fooPtr`.

(c) Use one C++ statement (ending with a semicolon) that declares two integers `foo` and `bar`, as well as pointers to them `fooPtr` and `barPtr`.

2. Suppose that `double v;` is already defined. Write C++ statements that do the following.

(a) Prints the memory address of `v` to `cout` (assume `cout` is already defined).

(b) Declares a pointer to `v` named `vpPtr`.

(c) Prints the value of `v` to `cout`, do not use the variable `v` in your statements.

(d) Changes the value of `v` to $33v - 10$, do not use the variable `v` in your statements.

3. The snippet of code at the right did not produce the programmer's anticipated output of

```
x = 3 = 3
```

State why, and speculate what the program actually did print out.

```

1  #include <iostream>
2  #include <cmath>
3  using namespace std;
4
5  int main()
6  {
7      double y( acos(-1) );
8      double x(2);
9      double w( exp(1) );
10
11     double *xptr( &x );
12
13     x *= *xptr;
14     *xptr /= 2;
15     xptr += 1;
16     cout << "x_=" << x << "_="
17          << *xptr << endl;
18     return 0;
19 }
```

4. The `const` keyword could have been used by the programmer in question 3 and time would not have been wasted finding the logic bug. That is to say, the programmer could have used `const` and had the compiler find the error automatically. How would you modify the program to accomplish this by adding just one `const`?
5. Write C++ statements to perform the following:
- Allocates enough memory for an array of 30,000 doubles. The code should check for an allocation error, if there is one it should perform `exit(1)` after an error message is displayed.
 - Allocates a 10,000 element array of type `BigImage` (which has a default constructor).
 - Frees the memory allocated in part a.
 - Frees the memory allocated in part b.
6. Suppose your disk has two files containing lists of numbers: `double.txt` and `integer.txt`. Write a program that opens each file, counts how many numbers are in each file, allocates the appropriate amount of memory for arrays to hold these numbers, checks for memory allocation failure (displaying an error message and using `exit(1)` if `new(nothrow)` fails), and then rereads the data files populating the appropriate arrays. After all of this, print the sum of all the numbers in both arrays, free the memory appropriately, and finish the program with `exit(0)`.