CMPT 135-D100 Mini Midterm
Spring 2024

First name (please write as legibly as possible within the boxes)

Last name

SFU ID number

This is a **20 minute closed book exam**: notes, books, computers, calculators, electronic devices, etc. are **not** permitted. Do not speak to any other students during their exam or look at their work. Please remain seated and **raise your hand** if you have a question.

Pointers and Memory Management

(5 marks) Write a function called `safe_delete(string* s, string* t)` that correctly deletes the values that `s` and `t` point to. Assume the following:

- It's possible that one, or both, of `s` and `t` could be the null pointer.
- If `s` and `t` do point to strings, then those strings are on the free store.
- `s` and `t` might point to the same string, or to two different strings.

Use this function header and write your answer under it:

```
void safe_delete(string* s, string* t) {
```

Object-oriented Programming and Inheritance

(5 marks) Create a class called `Circle` that stores the (x,y)-center and radius of a circle. Make these private, and call them `x`, `y`, and `radius`. In addition, add the following:

1. A **default constructor** that sets both `x` and `y` to 0, and the `radius` to 100.
2. A **copy constructor** that uses an **initialization list** to make a new `Circle` object that is a copy of a another `Circle` object.
3. A **destructor** that prints "done!".
4. A **setter** that lets the user change the `radius` of the circle. If a user tries to set `radius` to a value that is 0 or less, then the `radius` is *not* changed.

Multiple Choice

For each of the following questions, fill in **the one best answer** on the answer sheet.

Every correct answer is worth 1 mark. Incorrect answers, unanswered questions, questions with more than one answer, or questions with illegible answers, are worth 0.

1) Consider these statements:

   i) Any C++ for-loop can be re-written as a while-loop that does the same thing.
   ii) Any C++ switch statement can be re-written using just if-statements or if-else statements.

   A. i) and ii) are both true
   B. i) and ii) are both false
   C. i) is false and ii) is true
   D. i) is true and ii) is false

2) Consider these statements:

   i) Blackbox tests for a function can be written before the function's body is written.
   ii) Unit testing is a kind of whitebox testing.

   A. i) and ii) are both true
   B. i) and ii) are both false
   C. i) is false and ii) is true
   D. i) is true and ii) is false

3) Suppose `arr` points to an array of 10 doubles in the free store. What is the correct way to de-allocate `arr`?

   A.
```
for(int i = 0; i < 10) {
    delete arr[i];
}
```

   B.
```
for(int i = 0; i < 10) {
    delete arr[i];
}
delete[] arr;
```

   C.
```
delete arr;
```

   D.
```
delete[] arr;
```