

## These instructions will be on the front page of the exam:

### **!!IMPORTANT!!: READ THE FOLLOWING INSTRUCTIONS BEFORE STARTING:**

1. You may detach the crib sheet (the last two pages), but all pages of this exam paper must be turned in. Do not remove any pages from the exam room.
2. Do not ask a question unless you believe that you have found a mistake in the exam paper. Exam questions will not be explained, and no hints will be given. If you think something is unclear or ambiguous, make a reasonable assumption (one that does not contradict the question), write it at the start of your solution, and answer the question.
3. Unless otherwise stated, recursion is optional on all programming questions.
4. To get full marks, comments are required on all programming questions.
5. For all method implementations, you must include the changes required to both the header file (indicate whether the changes go in the private or public sections) and the implementation file.
6. If you are extending a class, you may use the existing methods of a class.
7. You may write as many additional functions / methods as required to solve a problem.

## These instructions will be on the front page of the exam booklet:

### Notes:

1. Please re-read the important notes on the first page of the exam.
2. Unless you have found a typo, you are permitted to ask only **one** question!
3. Answer the questions on the right hand pages in the space provided.
4. Use the left hand pages (back of each page) for rough work.
5. There is a spare page at the back of the answer booklet. If you use the spare page for any question, make a note of that on the page provided for that question.
6. If you want something on the back of a page marked, write a note indicating that on the nearest **right hand** page, circle the part you want marked, and write "MARK THIS" next to it.
7. Re-read the important notes on the first page of the exam again!!