

CPSC 131 Spring 2023 Midterm Overview

Name *(please print)*

Signature

CWID: *(please print)*

Section: *(please print)*

Spring 2023

Exam date and time

This exam is closed-book and closed-notes. The packet is generous with blank space; you do not necessarily need to fill all the given space. You have the entire class (75 minutes) to take the exam.

Exam Serial Number: «M_01SN»«M_01SN»

Part I: Multiple choice (10 questions, 2½ pts each)

Place an **X** next to the most appropriate choice for each of the following questions. Each question has exactly one best answer.

1. Are Mondays better than Fridays?

- | | |
|--------------------------|-------------------|
| <input type="checkbox"/> | Yes |
| <input type="checkbox"/> | No |
| <input type="checkbox"/> | Only on Tuesdays |
| <input type="checkbox"/> | Never on Saturday |

2. Which came first?

- | | |
|--------------------------|-----------|
| <input type="checkbox"/> | Chicken |
| <input type="checkbox"/> | Egg |
| <input type="checkbox"/> | Hot Wings |
| <input type="checkbox"/> | Omelets |

Part II: Data Structure Sketches (4 questions)Question 1 of 4:

Sketch the face of a CPSC 131 college student after the following sequence of operations. You don't have to show the face after each step, only the final face. You may find it useful to make intermediate sketches; just be sure that its clear which sketch is your final answer. (6 pts)

- 1. Starting a programming project**
- 2. Halfway through a programming project**
- 3. Completing a programming project and all tests pass**

Part III: Analyzing alternatives (3 questions)

Question 1 of 3: Go-Cart vs. Ice Cream Truck

You are asked to buy a new vehicle that will get you to and from work and school. Which is better, a go-cart or an ice cream truck? Explain your answer for this specific application. Answer in terms of Big-O with 4-5 complete sentences. (*Looking for a **selection** and **explanation**, do not write code*) (8 pts)

Part IV: Implementing Data Structure Operations

Write well-formed C++ code that defines and implements a new public member function of the attached (one of our studied data structure implementation examples)

Implement your function using recursion. That is, your new public member function must call a new private, recursive helper function. The helper function should not have any iterative (e.g., for, while) loops at all. Do not use global variables. Both new functions should call existing member functions when appropriate. Refer to the attached reference code for the existing functions available. Write your response in the space below clearly indicating which is the public and which is the private function.

You cannot add additional attributes to the class. You may assume the default, copy, and move constructors, and all the operators (e.g., <, <=, ==, +, ++, =, +=, <<) are defined for element type T.

The public function declaration (prototype) and description of the new function you are to write is:

One of:

- To Be announced in class

Step 1: Public function's declaration (prototype) – given to you above

Step 2: Write the private helper function's declaration (prototype)

(3 pts)

Step 3: Write the public function's definition (complete function)

(5 pts)

Step 4: Write the private helper function's definition (complete function)
Clearly identify with comments the Base Case, Visit, and Recurse steps

Base Case	(5 pts)
Visit	(5 pts)
Recurse	(5 pts)
Other	(2 pts)