



Examination
Final
Winter 2025
CS 240E

Special Materials

Candidates may bring only the listed aids.
• Study Notes - Double-Sided 8.5x11 (Hand-written or printed. Hand in with the exam.)

Please print in pen:

Waterloo Student ID Number:

--	--	--	--	--	--	--	--

WatIAM/Quest Login Userid:

--	--	--	--	--	--	--	--

Times: Thursday 2025-04-17 at 19:30 to 22:00 (7:30 to 10PM)
Duration: 2 hours 30 minutes (150 minutes)
Exam ID: 6058256
Sections: CS 240E LEC 001
Instructors: Therese Biedl

- Proctors will not answer questions. In case of a perceived ambiguity, state your assumptions clearly.
- Write your answer in the space provided. You should not require extra space.
- If you do need more space, you may use the extra pages at the front and back of the exam. Indicate clearly at a question’s page if you have done so. Only QR-coded pages will be marked.
- Each question will tell you whether you need to justify the answer. Even if no justification is needed, it is a good idea to show some of your work for a chance at part-marks in case of minor errors.
- A few reminders/comments:
 - You may use any result from lectures, assignments or tutorials without proof.
 - The function *random*(*n*) returns a randomly and uniformly chosen integer in $\{0, \dots, n-1\}$.
 - The *upper median* of a sorted set of *n* elements is the middle element if *n* is odd and the larger of the two middle elements if *n* is even.
 - You do not have to redraw unchanged parts of a data structure; instead you may draw an abstract shape and label it with “same as above”.
- Sign your full name **in pen** here:

Question	1(a-e)	1(f-j)	2	3(a-d)	3(e-i)	4(a-c)	4(d-f)	5	6	7(a)	7(b)	8	9	10	Total
out of	5	5	10	9	10	8	8	7	7	8	3	7	6	7	100