- This quiz counts as **o**% of your total grade.
- *Read each question carefully. Ask yourself what the point of the question is. Check to make sure that you have answered the question asked.*
- This exam contains **2** pages of questions not including this cover page. Make sure that you have all of them.
- **1.** (a) How many comparisions are required to sort 5 items?
 - (b) Design a sorting algorithm that sorts exactly 5 things in the above number of comparisons. [This may be hard.]
 - (c) Explain why comparison-based sorting has an $\Omega(n \log n)$ worst-case time.

2. Write down the definition of a *strict weak order*.

3. You do some tests and find that it takes 38.0 ms on average to sort an array of 1000 items using a version of heap sort that you have coded.

Algorithm	Average-	Worst-case	Extra stor-	stable
	case Θ -time	Θ-time	age require-	(ves / no)
			ments	
insertion				
sort				
		I	I	
01 11 /				
Shell sort				
merge sort				
(for arrays)				
(IOI ulluyb)				
• 1 •				
quick sort				
heap sort				
neur son	1			

 Table 1: Table for Question 4

Justifications:

Would you feel confident that your algorithm can sort 1000000 items in 2 minutes? Why or why not?

- 4. Fill in the table on page 2. Justify entries that you feel need justifying.
- **5.** Write down a list of things to check when examining the coding of someone else's quick sort.