Midterm

Engi 8893

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Total marks: **30**
Name:
Student #:
Q0 [10]
Complete the following proof outline validly.

$\neg f \vee x == Z$

Global inv: _____
co

_____
$\langle$await(f) $y := 2x$;$\rangle$

_____
//

_____
$\langle f, x := true, Z; \rangle$

_____
oc
$y == 2Z$

Q1 [10] Barrier

Exactly N threads need to do a barrier synchronization. Each thread i calls procedure

procedure barrier(**int** i)

with i as argument. Design a monitor that exports procedure barrier. Use either Andrew's design notation or Java with the monitor package. Document the invariant and any assertions associated with conditon variables.

Q2 [10] Sum
We want to parallelize

$$\text{for}[\ i = 0 \text{ to } N-1]\ \{\ A[i] := \sum_{j \in \{0,..,i\}} B[j] \times C[N-1-j]\ ;\ \}$$

Design an algorithm (in psuedocode) for a fast ($O(\log N)$ time with N processors) solution using shared memory and barrier synchronization. (Each process p calls barrier(p) to synchronize with the others.