CS 493 Cluster Computing
Sample Test 2
50 minutes

Three pages.
Attempt all questions in the spaces provided.   **Name:** ....
Use additional paper if necessary.

Total Mark/30

Part I

Do not refer to any other materials.
Qu. 1   Answer each of the following <u>briefly</u>:

(a)   What is meant by the term *receiver-initiated* in decentralized dynamic load balancing?   2

(b)   What is the difference between a (heavyweight) process and a thread?   2

(c)   What is a detached thread?   2

(d)   What is meant by the term *thread-safe*?   2

(e)   How many steps are needed in the tree implementation of a barrier, given *n* processes?   2

(f)   Can: 4

```
int a[100];
for (i = 0; i < 4; i++) {
    a[i] = a[i + 2];
}
```

be re-written as:

```
int a[100];
forall (i = 0; i < 4; i++) {
    a[i] = a[i + 2];
}
```

and still obtain the same results? Explain.

Part II

Open Book - You may refer to any materials.

Qu. 2   Write a complete parallel program in MPI to solve the one-dimensional heat distribution problem based upon finite difference equation:

$$x_i = \frac{x_{i-1} + 2x_i + x_{i+1}}{2}$$

for $0 \le i < 10$, using 10 processes.

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