

# Arab Academy for Science, Technology, and Maritime Transport

College of Computing and Information Technology – CS322

College of Engineering and Technology – CC418

## Operating Systems

Fall 2012

### Section Assignment #1

Date Assigned:

Date Due:

Submissions should be typed. Be sure to write your name, registration number, assignment number, and course code.

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The following problems are taken from Chapter 1 of "Operating Systems: Internals and Design Principles" by William Stallings (7<sup>th</sup> Edition).

1.10) Consider the following code:

```
for (i = 0; i < 20; i++)
    for (j = 0; j < 10; j++)
        a[i] = a[i] * j
```

- a. Give one example of the spatial locality in the code.
- b. Give one example of the temporal locality in the code.

1.13) A computer has a cache, main memory, and a disk used for virtual memory. If a referenced word is in the cache, 20 ns are required to access it. If it is in main memory but not in the cache, 60 ns are needed to load it into the cache (this includes the time to originally check the cache), and then the reference is started again. If the word is not in main memory, 12 ms are required to fetch the word from disk, followed by 60 ns to copy it to the cache, and then the reference is started again. The cache hit ratio is 0.9 and the main-memory hit ratio is 0.6. What is the average time in ns required to access a referenced word on this system?