University of California Santa Cruz
Baskin School of Engineering
Computer Science Department

CMPS111 Spring 2018

Homework 2

Marks Available: **25 (5% of final course mark)**

Submission:

Due:	**23:59 Wednesday April 25, 2018**
Format:	**Single PDF Document**
Where**:**	**Canvas**

(6 Marks) *Question 1.* Briefly outline the role of the Process Control Block (PCB), listing and describing three pieces of information an Operating System might choose to store in the PCB.

(4 marks) *Question 2.* If we assume that when processes are interrupted they are placed in a queue containing all non-running processes not waiting for an I/O operation to complete, briefly describe two strategies the Operating System might adopt to service that queue. One-word answers will not suffice.

(5 marks) *Question 3.* Outline a mechanism by which counting semaphores could be implemented using the minimal number of binary semaphores and ordinary machine instructions. Include C or pseudo code snippets if you feel this will make your answer clearer and/or more concise.

(4 marks) *Question 4.* Define the terms “race condition”, “deadlock”, and “starvation” as they relate to Operating System design and outline the relationship between deadlock and starvation.

(6 marks) *Question 5.* Can the “priority inversion” problem outlined in section (3) of the background information to Lab 2 occur if user-level threads are used instead of kernel-level threads? Explain your answer.

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