**Department of Computer Science and Engineering**

**A**

**Final Examination Spring 2023**

**CSE 321: Operating Systems**

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| **Duration:** 2 Hours | **Total Marks:** 40 |

Answer the following questions.

Figures in the right margin indicate marks.

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| **1.**  **CO4** | **a)** In a restaurant, there are 3 washrooms available for male guests and 1 washroom available for female guests. There is a strict rule maintained by the authorities that neither men can use the female washroom nor women can use any of the male washrooms. On a random day during lunch time, 9 male guests needed to use washroom facilities at the very same time. But none of them were allowed to use the female washroom although it was vacant. Therefore, only 3 guests were able to get access to washrooms at a time and others had to wait while maintaining a queue. If any of the washrooms gets vacant, a person from the queue can get access to that. Logically **explain** which synchronization method has been used here. | [3] |
|  | **b)** For Peterson’s problem below conditions will be applied.   * There are two processes: P1 and P2. * Each Statement takes 4ms to execute, P1 gets executed first * Context Switch will occur after 16ms. * Critical section contains 4 statements. * Remainder section contains 2 statements. * For P1: i = 0 and j = 1 * For P2: i = 1 and j = 0 * turn=0 * flag[0] = FALSE, flag[1] = TRUE   **The structure of process Pi in Peterson’s solution:**   |  | | --- | | **do{**  **flag[i] = true;**  **turn = j;**  **while(flag[j] == true && turn == 1){**  **//busy wait**  **}**  **//critical section**  **flag[i] = false;**  **//remainder section**  **}while(true);** | |  |
|  | **Complete** the table given below for processes P1 and P2 using **Peterson’s solution.**   |  |  | | --- | --- | | Process 1: i = 0, j = 1 | Process 2: i = 1, j = 0 | |  |  | |  |  | |  |  | |  |  | |  |  | | [4] |