**Department of Computer Science and Engineering**

**BN**

**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** | 1. 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 lunchtime, 4 female guests needed to use washroom facilities at the very same time. But none of them were allowed to use any of the male washrooms although two of them were vacant. Therefore, only 1 guest was able to get access to the washroom at a time and others had to wait while maintaining a queue. If the washroom gets vacant, a guest from the queue can get access to that. Logically **explain** which synchronization method has been used here.   = semaphore + queue | [3] |
|  | **b)** For Peterson’s problem below conditions will be applied.   * There are two processes: P1 and P2. * Each Statement takes 5ms to execute, P1 gets executed first * Context Switch will occur after 20ms. * Critical section contains 2 statements. * Remainder section contains 4 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 | | F[0]=T, T=1  While T |  | |  | F[1]=T, T=0  While F, CS1 | |  |  | | While T |  | |  | CS2, F[1]=F, RS1-2 | | While F  CS 1-2, F[0]=F |  | |  | RS 3-4 | | RS1-4 |  | |  |  | |  |  | |  |  | |  |  | | [4] |