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| **https://upload.wikimedia.org/wikipedia/commons/thumb/4/4e/VU_Logo.png/260px-VU_Logo.png** | **Operating System (CS604)**  **Spring 2023**  **Assignment # 02** | **Total Marks = 20**  **Deadline Date 13/07/2023** |
| **Please carefully read the following instructions before attempting the assignment.**  **RULES FOR MARKING**  **It should be clear that your assignment would not get any credit if:**   * **The assignment is submitted after the due date.** * **The submitted assignment does not open or the file is corrupt.** * **Strict action will be taken if the submitted solution is copied from any other student or the internet.**   **You should consult the recommended books to clarify your concepts as handouts are not sufficient.**  **You are supposed to submit your assignment in Doc or Docx format.**  Any other formats like scan images, PDF, Zip, Rar, Ppt, and Bmp, etc will not be accepted.  **OBJECTIVE**  **The objective of this assignment is to provide hands-on experience of:**   * **Deadlock characterization** * **Deadlock Avoidance** * **Deadlock handling** * **Paging** | | |
| **NOTE**  **Assignement No. 2 covers 27-34 lectures.**  **No assignment will be accepted *after the due date via email in any case* (whether it is the case of load shedding or internet malfunctioning etc.). Hence refrain from uploading assignments in the last hour of the deadline. It is recommended to upload the solution file at least two days before its closing date.**  **If you find any mistake or confusion in the assignment (Question statement), please consult with your instructor before the deadline. After the deadline, no queries will be entertained in this regard.**  **For any query, feel free to email at:**  **[CS604@vu.edu.pk](mailto:CS604@vu.edu.pk)** | | |

**Question No. 01 05 Marks**

Suppose a system has resource type **C** with 16 instances and 5 processes and the current system state is shown in the following table.

|  |  |  |
| --- | --- | --- |
| **Process** | **Max Need** | **Allocated** |
| P0 | 11 | 4 |
| P1 | 6 | 3 |
| P2 | 13 | 4 |
| P3 | 15 | 3 |
| P4 | 7 | 2 |

Calculate the **Need** for each resource by using the need formula and draw the **Need Matrix**.

**Question No. 2 10 Marks**

Assume a **logical address space** of 64 pages of 2048 words, each mapped into a physical

memory of 32 frames. You are required to calculate the following parameters related to paging.

No. of bits needed for **p** = ? bits

No. of bits needed for **f** = ? bits

No. of bits needed for **d** = ? bits

Logical address size = ? bits

Physical address size = ? bits

**Question No. 03 05 Marks**

The performance measure in paging is the **effective memory access time**. With part of the page table in the TLB and the rest in the main memory. In the context of paging, you are required to calculate the **Teffective** by considering the following factors.

**Tmem** = 200 nsec

**TTLB** = 20 nsec

**Hit ratio** = 90%

Calculate the **Effective Memory Access Time** (**Teffective)** by using the formula. Show each step of the calculation.

**The End**