Planning Document

Course: Operating Systems **Course Faculty:** Dr Suresh Kumar K

Activity: ARCS Model Teaching **Class – II Year IT/CSE/AI&DS**

Teaching Unit/Point: Unit 2 – Broad Topic - Process Synchronization
Sub. Topic - Requirements of Critical Section Problem

Learning Objective: ***To introduce the critical-section problem and solution to the critical section problem***

Discipline: Information Technology

<table>
<tr><th>Component</th><th>Implementation Strategies</th></tr>
<tr><td>Attention</td><td><u>The class will start with the following poll question. (10 Minutes)</u>

How many of you are familiar with the process of ATM withdrawal?

<u>The students will brainstorm with the following questions, and answers will be noted on the board</u>.
1. How can a person do a transaction in an ATM at a time?
2. If two or more people need to do a transaction, what will they do?
3. Are multiple people allowed inside an ATM at a time?
4. After completing a transaction, what a person should do?
5. In an ATM, is it advisable to do multiple transactions by a person? If many people are waiting in a queue. If not, what should he need to do?</td></tr>
<tr><td>Relevance</td><td><u>Correlating with concepts (10 minutes)</u>

A Brief discussion to relate the process of ATM with Critical Section problem in operating systems and requirements to solve CS problem.

<table>
<tr><th><u>Critical Section (Requirements)</u></th><th><u>ATM scenario</u></th></tr>
<tr><td>Critical section</td><td>Accessing ATM at a time, only one person should access the machine.</td></tr>
<tr><td>Mutual exclusion</td><td>One person has to wait when the other person is using an ATM.</td></tr>
<tr><td>Progress</td><td>If a person completes his task, the other person should be permitted to access the ATM.</td></tr>
<tr><td>Bounded waiting</td><td>A person can do many Transactions if no one is present in the queue. If many are</td></tr>
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<table>
<tr><td></td><td></td><td>waiting, the user needs to return to the queue and wait for his turn.</td></tr>
<tr><td>Confidence</td><td colspan="2"><u>Lecture on CS problem</u> <u>(10 minutes)</u>

A brief on the Critical Section problem and its solution using PPT.

<u>Group Activity (10 minutes)</u>
• The class will be split into eight teams / 4 students per team.
• Pseudocode will be distributed as a handout to each team to discuss the following questions and come up with answers.
Example: Handout

<table>
<tr><td>Process1</td><td>Process 2</td></tr>
<tr><td>do
{
flag1= TRUE;
turn = 2;
while(flag2 && turn==2);
print(“process1”);
flag1=FALSE;
}while(1);</td><td>do
{
flag2= TRUE;
turn = 1;
while(flag1 && turn==1);
print(“process2”);
flag2=FALSE;
}while(1);</td></tr>
</table>
1. Identify the critical section statement in the given pseudocode.

2. Identify the functions that resolve the CS issue.

3. List the statement that preserves the requirement.</td></tr>
<tr><td>Satisfaction</td><td colspan="2"><u>Discussion and feedback (10 minutes)</u>

<u>Answer</u>
<table>
<tr><td>Critical Section</td><td>Print statement in both process</td></tr>
<tr><td>Mutual Exclusion</td><td>Variable - turn</td></tr>
<tr><td>Progress</td><td>flag1, flag2, turn</td></tr>
<tr><td>Bounded waiting</td><td>While loop</td></tr>
</table>
• Feedback will be collected for the Activity carried out.
• Answers will be discussed and make them evaluate their answers script.
• Each team member will be awarded points based on the correct answer.</td></tr>
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