### First Question

**Q1 B1**

**Choose the best Answer:**

1) Which one of the following versions of computer systems does not have an OS:
   - a) Simple Batch Processing
   - b) Serial Processing Systems.
   - c) Time Sharing Systems.
   - d) Uni-Programming based Systems

2) The contents of the PC register is:
   - a) The next instruction to be fetched
   - b) The instruction to be executed
   - c) The address of the next instruction to be fetched.
   - d) The data to be used by the ALU.

3) When interrupt occurs, the contents of PSW go to:
   - a) Cash memory
   - b) Control stack
   - c) Interrupt service routine memory area
   - d) None of the above.

4) What services are provided by the OS:
   - a) Program execution.
   - b) Access to I/O devices.
   - c) Controlled access to files.
   - a) Error detection and response
   - b) All of the above

5) Which of the following is a reason of process creation:
   - a) New batch job
   - b) Interactive login
   - c) Spawned by existing process
   - d) All of the above

6) One of the following is NOT a reason of process termination:
   - a) Child Termination
   - b) Normal Completion
   - c) Bound Violation
   - d) Arithmetic Error
7) Which of the following OSs supports multiple user processes but only supports one thread per process:
   a) MS DOS
   b) Windows
   c) UNIX
   d) Solaries

8) When Process is waiting on the disk for an event to finish; then it's state is called"
   a) Running
   b) Suspended
   c) Blocked
   d) Spawned

9) A computer systems where Single processor executes a single instruction stream to operate on data stored in a single memory is called:
   a) Single Instruction Single Data stream (SISD).
   b) Single Instruction Multiple Data stream (SIMD).
   c) Multiple Instruction Single Data stream (MISD)
   d) Multiple Instruction Multiple Data (MIMD)

10) A process can be switched because of:
    a) Clock interrupt
    b) I/O interrupt
    c) Memory fault
    d) All of the above

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**Second Question**  |  **No. of Branches (1)**  |  **(6/20)**

**Q2 B1**  
**Essay Questions**

1) Define the two main categories of processor registers?
2) What is an interrupt? How are multiple interrupts dealt with?
3) For what types of entities does the OS maintain tables of information for management purposes? Explain your answer
4) Explain three general categories of information in a process control block?
5) List reasons why a mode switch between threads may be cheaper than a mode switch between processes?
6) What are the four conditions that create deadlock?
A system has three processes, P1, P2, and P3, and four types of resources, R1-R4. The total system resources are:

- R1 – 1 unit
- R2 – 2 units
- R3 – 1 unit
- R4 – 3 units

The needs and state of each process are:

- P1 holds 1 R2 and requests 1 R1
- P2 holds 1 R1 and 1 R2, and requests 1 R3
- P3 holds 1 R3 and requests 1 R2

1. Draw the resource allocation graph representing the current state of the system?
2. Is the system deadlocked? Explain?
Given the following state for the Banker’s Algorithm.

6 processes P0 through P5
4 resource types: A (15 instances); B (6 instances) C (9 instances); D (10 instances)

<table>
<thead>
<tr>
<th>Process</th>
<th>Current allocation</th>
<th>Maximum demand</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>B</td>
</tr>
<tr>
<td>P0</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>P1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>P2</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>P3</td>
<td>1</td>
<td>0</td>
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<tr>
<td>P4</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>P5</td>
<td>1</td>
<td>0</td>
</tr>
</tbody>
</table>

1) Verify that the Available array has been calculated correctly?
2) Calculate the Need matrix?
3) Show that the current state is safe, that is, show a safe sequence of processes?
4) Given the request (3,2,3,3) from Process P5. Should this request be granted? Why or why not?

Good Luck