**Department of Computer Science and Engineering**
**MIDTERM EXAMINATION Summer 2022**
**CSE321: Operating Systems**

**Total Marks: 30** **Time Allowed: 1 Hour 15 min**

**[Answer All Questions. Understanding the question is a part of the exam.]**

<table>
<tr><td>CO1<br>CO2</td><td>1.</td><td>a) What is multiprogramming? What are the requirements for multiprogramming?<br>b) Explain User mode and Kernel mode execution with example.<br>c) Define system call? Explain how system call works using System Call Interface.</td><td>3<br>4<br>3</td></tr>
<tr><td>CO2</td><td>2.</td><td>a) Though we can increase the hardware resources as much as we want by money, still why do we implement the thread? Explain how the thread accelerates the computing power with an example.<br>b) A system has processes to execute of which 40% is parallel. If the number of cores is increased from 2 to 4, what will be the increase in performance?<br>c) Find the output of the following code -<br><br>
<pre>
int main()
{
   int id, i;

   printf("Start of main...\n");

   id = fork();
   if (id > 0) {

      printf("Parent section...\n");
   }
   else if (id == 0) {

      printf("\n fork created...\n");
   }
   else {
       printf("\n fork creation failed!!!\n");
   }

   printf("Printing the numbers from 1 to 10\n");
   for (i = 1; i <= 10; i++)
      printf("%d ", i);
   printf("\n");
   printf("End of the main function...\n");

   return 0;
}
</pre>
</td><td>3<br><br>3<br><br>4</td></tr>
<tr><td>CO3</td><td>3.</td><td>a) Find which CPU scheduling is more efficient between priority scheduling and Round Robin in terms of waiting time and context switch. Where quantum time is 4 (q=4).
<table>
<tr><th>Process</th><th>Arrival time</th><th>Burst time</th><th>Priority</th></tr>
<tr><td>P0</td><td>14</td><td>9</td><td>5</td></tr>
<tr><td>P1</td><td>5</td><td>10</td><td>2</td></tr>
<tr><td>P2</td><td>0</td><td>13</td><td>3</td></tr>
<tr><td>P3</td><td>9</td><td>8</td><td>1</td></tr>
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</td><td>8</td></tr>
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|---|---|---|---|---|---|---|
| | | | P4 | 20 | 11 | 1 |
| | | b) What is starvation and how can it be solved? | | | | 2 |