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COM 2005 Data Structures
Midterm Exam, 01.12.2023, 13:00
Duration : **105** Minutes

CEVAPLAR

```
void newAdd(CircularlyNode* newNode,
            CircularlyNode* front, CircularlyNode* back)
{
       if (newNode->score < front->score)
       {
              back = front;
              front = front->next;
              if (back == cursor)
              {
                     cursor->next = newNode;
                     newNode->next = front;
                     cursor = cursor->next;
                     return;
              }
              newAdd(newNode, front, back);
       }
       else
       {
              back->next = newNode;
              newNode->next = front;
       }
}

int main()
{
  CircularlyLinkedList list;
  list.add("Paul", 720);

  CircularlyNode* newNode = new CircularlyNode;
  newNode->elem = "Rose";
  newNode->score = 590;
  list.newAdd(newNode, list.cursor->next, list.cursor);

  newNode = new CircularlyNode;
  newNode->elem = "Anna";
  newNode->score = 660;
  list.newAdd(newNode, list.cursor->next, list.cursor);

  newNode = new CircularlyNode;
  newNode->elem = "Mike";
  newNode->score = 1105;
  list.newAdd(newNode, list.cursor->next, list.cursor);

  newNode = new CircularlyNode;
  newNode->elem = "Jack";
  newNode->score = 510;
  list.newAdd(newNode, list.cursor->next, list.cursor);

  list.print(); // prints cursor->next first
}
```

1. What is the output of the program above? **(20P)**

Mike 1105
Paul 720
Anna 660
Rose 590
Jack 510

2. What is the number of **newAdd()** recursive calls for **newNode → ["Jack",510]** ? **(20P)**

3

```
int binarySum(int A[], int i, int n)
{
   if (n == 1)
      return A[i];
   else
   {
      int Sum = binarySum(A, i, n / 2) +
                binarySum(A, i + n / 2, n / 2);
      cout << Sum << " ";
      return Sum;
   }
}

int main()
{
     int A[16]= { 1,2,0,3,4,0,5,6,0,7,0,8,0,9,0,10};
     int binSum = binarySum(A, 0, 16);
}
```

3. What is the output of the program above? **(20P)**

3	3	6	4	11	15	21	7	8	15	9	10	19	34	55

4. How many times does the function **binarySum()** call itself recursively? **(20P)**

30

```
int main()
{
      CircularlyLinkedQueue Queue;

      Queue.enqueue(4);
      Queue.enqueue(3);
      Queue.enqueue(2);
      Queue.enqueue(1);

      Queue.dequeue();
      Queue.dequeue();

      Queue.enqueue(5);
      Queue.enqueue(6);

      Queue.dequeue();
      Queue.dequeue();

      Queue.enqueue(3);
      Queue.enqueue(7);

      Queue.C.print();
}
```

5. What is the output of the program above? **(20P)**

5
6
3
7