

# CSE 202 Midterm 1

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## I. QUESTION (DOUBLELINKLIST) (15 POINTS)

Write the method

```
void insertSecond(DoubleNode node)
```

which inserts a new node after the second element in a double link list.

## II. QUESTION (DOUBLELINKLIST) (20 POINTS)

Write the method

```
DoubleNode middleElement()
```

which returns the middle element of a double link list.

## III. QUESTION (LINKLIST) (15 POINTS)

In the city Zion, there is a new year lottery. Each member of each family in Zion has a number starting from the first family member. For example, the first member of the first family has the number 1, second member 2, etc. If the first family has 5 members, the first member of the second family has the number 6, second member 7, etc. In the lottery, a number  $K$  is determined and depending on that number the winning family (who owns that number) is announced. Given a single link list of integers showing the number of persons in each family, and a lottery number  $K$ , write a method that determines which family (the link list node) wins the lottery. For example if Zion has 6 families and the number of persons in each family are 5, 2, 4, 7, 3, 8 and the winning number ( $K$ ) is 15, the winner is 4th family. If the winning number is 20, the winner is 5th family.

```
Node lottery(int K)
```

## IV. QUESTION (LINKLIST) (15 POINTS)

Write the method

```
LinkedList removeMultiple(int N)
```

which will remove nodes, whose data is divisible by  $N$ , from the original single link list and creates a new single link list from those nodes that are removed. The method will return the new link list.

## V. QUESTION (STACK) (20 POINTS)

Write the method

```
int lastItem()
```

which returns the last item of the stack. You are only allowed to use pop, push, isEmpty functions.

## VI. QUESTION (STACK) (15 POINTS)

Write the method

```
boolean palindrome()
```

which returns true if the elements in the stack constitute a palindrome, false otherwise. You are only allowed to use pop, push, isEmpty functions (Hint: Use two external stacks).