CSE 202 Midterm 1

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I. QUESTION (ALGORITHM ANALYSIS) (15 POINTS)

Given the following function

```
int algorithm1(int N){
  int i, j, k, sum = 0;
  for (i = 1; i <= N; i++)
     for (j = i; j <= N; j++)
        for (k = 1; k <= j - i; k++)
           sum++;
  return sum;
}
```

What does the function algorithm1 return in terms of N?

II. QUESTION (ALGORITHM ANALYSIS) (15 POINTS)

Given the following function

```
int algorithm2(int N){
  if (N == 0)
     return 0;
  sum = 0;
  for (i = 0; i < N; i++)
     sum++;
  return algorithm2(N - 1) + sum;
}
```
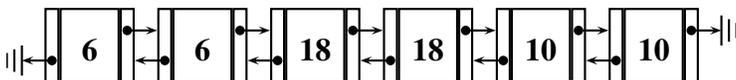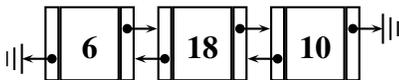
What does the function algorithm2 return in terms of N?

III. QUESTION (DOUBLYLINKEDLIST) (20 POINTS)

Write the method

```
void doubleList()
```

which doubles each node in a doubly linked list, that is, after each node inserts that node again.

IV. QUESTION (STACK) (20 POINTS)
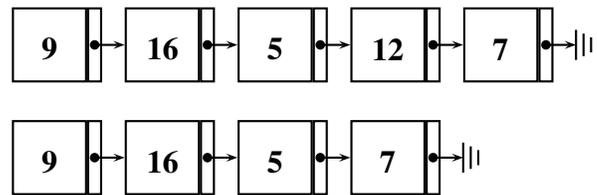
Write the method

```
Stack copy()
```

which returns a copy of the stack as a new stack. You are not allowed to use pop, push functions. Write the function for both link list and array implementations.

V. QUESTION (LINKEDLIST) (15 POINTS)

Write the method

```
void removeBeforeLast()
```

which removes the node before the last node of a single link list.

VI. QUESTION (STACK) (15 POINTS)

Write the method

```
void doubleStack()
```

which double each item in the stack, that is, each item appears two times one after another in the stack. You are only allowed to use pop, push, isEmpty functions (Hint: Use external stack).