

BBM201 – Data Structures – Fall 2015

1st Midterm  
26.10.2015

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Süre ... dakikadır.

Question	1	2	3	4	5	6	7	8	Total
Points									100
Grade									

**Question 1.**

Mark the following statements as True or False. Correct the false statements with a concise explanation.

- (a) A data structure is a way to store and organize data in computer, so that it can be used easily.
- (b) Bottom-up and top-down analyses are two approaches in the system's life cycle.
- (c) Big-Oh (O) notation gives a lower bound on the running time of a program.
- (d)  $3n^2 + 10n \log n = \Omega(n^2)$
- (e)  $3n^2 + 10n \log n = O(n \log n)$

**Question 2.**

Let an array definition be:

```
int a[5][5][5][5];
```

What is the memory address of  $a[3][4][2][1]$  if the memory address of  $a[0][0][0][0]$  is  $x$ ?

**Question 3.**

Let  $a[n][n]$  be an upper triangular matrix (see the example given below). The elements of this triangular matrix are stored in a one-dimensional array as given below:

$a_{00}$	$a_{01}$	$a_{02}$	$a_{03}$
0	$a_{11}$	$a_{12}$	$a_{13}$
0	0	$a_{22}$	$a_{23}$
0	0	0	$a_{33}$

U

$a_{00}$	$a_{10}$	$a_{11}$	$a_{20}$	$a_{21}$	$a_{22}$	$a_{30}$	$a_{31}$	$a_{32}$	$a_{33}$
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Please complete the method `readtriangularmatrix(int[], int)` that reads integers from the keyboard and fills the one-dimensional array U with an upper triangular matrix.

```
void readtriangularmatrix(int U[], int n){
    int i, j, k;
    if(n*(n+1)/2 > MAX_SIZE){
        printf("\n invalid array size \n");
        exit(-1);
    }
    else
        for(i=0; i<=n-1; i++){
            k=.....
            for(j=0; j<=i; j++)
                scanf("%d", .....);
        }
}
```

#### Question 4.

Please write the output of the following method.

```
void doSomething(int value)
{
    if(0 < value && value < 10)
    {
        doSomething(value - 1);
        doSomething(value + 1);
        printf(" %d", value);
    }
}
```

#### Question 5.

Please write the output of the following method.

```
int result = negative(-3);
int negative(int num)
{
    if(num >= 20)
        return -5;
    else
        return negative(num + 4) + 2 * num;
}
void print()
{
    printf("The final answer is %d", result);
}
```

