Dersin Kodu: BIMU1052	**Dersin Adı:** INTRODUCTION TO ALGORITHMS
Dersin Öğretim Üyesi: Yrd.Doç.Dr. Özgür Can TURNA	**Sınav Türü:** Bitirme
Sınav Tarihi ve Süresi: 27.12.2017 (75dk)	**Öğrenci No:**
Öğrenci Ad - Soyad:	**İmzası:**

1. (20p) Write the output of these code segments.

a.
```cpp
int x = 30, y = 2, z = 5;
x = x + y * z + x;
cout << "X:" << x;
```
X: 70

b.
```cpp
int x = 1, y = 0;
if (y = x)
        x = x + y;
cout << "X:" << x << " & Y:" << y;
```
X: 2 & Y : 1

c.
```cpp
int a = 3, b = 4;
float c = a * 6 / (float)b;
cout << "C:" << c;
```
C: 4.5

d.
```cpp
int a = 3, b = 4; int *c = &a;
*c = a + *c *b ;
cout << "A:" << a << " & B:" << b;
```
A: 15 & B: 4

2. (10p) Write the output of this program below.

```cpp
#include <iostream>
using namespace std;
int main()
{
        char *ptr = NULL, name[50] = "Merhaba Dunya";
        int i,j, n = 0;
        for (i = 0; name[i] != '\0'; i++);
        n = i;
        ptr = name + n-1;
        for (i = 0; i < n ; i++)
        {
                if (i % 2 == 0) {
                        j = name[i / 2];
                        name[i / 2] = *ptr;
                        *ptr = (char)j;
                        ptr--;
                }
        }
        cout << name;
}
```

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3. (30) Write a program to calculate the formula below. n will be taken from user.

$$\sum_{k=1}^{n} \frac{10^n}{n!}$$

4. (20p)You have a struct definition like below. You will implement searchAndPrint function. It takes the number of the student and search it inside the org array. If the number exist in the list the function must print the student details otherwise it must give warning to the user "No student recorded with this number".

```c
struct student {
        char name[50];
        long number;
        float agno;
};
typedef struct student STD;
STD ogr[100];
void searchAndPrint(long number);  //Implement this function
```

5. (10p) Write the output of this program below.

```cpp
#include <iostream>
using namespace std;
int main()
{
        int p, k=0, m=0;
        for (p = 0; p < 10; p = p + k) {
                k = k + 1;
                m = m + p;
                cout <<  p << "    " << k << "    " <<  m << endl;
        }
}
```

0	1	0
1	2	1
3	3	4
6	4	10

6. (10p) Complete the code below to see the output on the right.

```cpp
void findCenterPoint3D(float mid[] , float p1[], float p2[] = 0 )
{
        if (p2 != NULL) {
                mid[0] = (p1[0] + p2[0]) / 2;
                mid[1] = (p1[1] + p2[1]) / 2;
                mid[2] = (p1[2] + p2[2]) / 2;
        }
        else
        {
                mid[0] = p1[0] / 2;
                mid[1] = p1[1] / 2;
                mid[2] = p1[2] / 2;
        }
}

int main()
{
        float x1[] = { 2 ,5, 5 }, x2[] = { 3 ,6 ,10 } , x3[3] ,
x4[3];
        findCenterPoint3D(x3, x1, x2);
        findCenterPoint3D(x4, x3);
        cout << "x4[" << x4[0] << " , " << x4[1] << " , " << x4[2]
<< "]";
}
```

```
x4[1.25 , 2.75 , 3.75]
```