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İSTANBUL ÜNİVERSİTESİ
Mühendislik Fakültesi
Bilgisayar Mühendisliği Bölümü

Dersin Kodu: BIMU1055	**Dersin Adı: INTRODUCTION TO PROGRAMMING**
Dersin Öğretim Üyesi: Yrd.Doç.Dr. Özgür Can TURNA	**Sınav Türü:**
Sınav Tarihi ve Süresi: 05.04.2017 (80dk)	**Öğrenci No:**
Öğrenci Ad - Soyad:	**İmzası:**

1. (14p) Suppose x is an array of integers, and we have just executed this code:

```
for(i=0;i<10;i++)
    x[i] = i+1;
```

Suppose that x[0] is stored at address 8630. What is the value of each of the following expressions ?

`x + 3`	8642 (Suppose an int stored in 4 Bytes)
`&x[0] + 3`	8642
`*x + 3`	4
`x[1] + 3`	5
`&x[1]`	8634
`*(x+2)`	3
`*(&x[2] +1)`	4

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2. (6p) What is the output of the following program? (Please write the answer on the following table.)

```
#include <stdio.h>
  func(int n, int m)
  {
    if(n<=0)
        return;
    func(n-2,m);
    for(int i=0;i<(m-n);i=i+2)
       printf("-");
    for(int i=0;i<n;i++)
       printf("*");
    printf("\n");

  }
void main()
{
   func(5,5);
}
```

Answer:

-	-	*				
-	*	*	*			
*	*	*	*	*		

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3. (20p) Write your own String Copy Function like "strncpy" without using any string or character library functions. (Just write the function body, nothing more)

```
char *My_strncpy(char *destination, const char *source, size_t size);
```

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```
char *My_strncpy(char *destination, const char *source, size_t size)
{
   int i = 0;
   while(i< size && source[i] != '\0' )
   {
       destination[i] = source[i];
       i++;
   }
   destinatin[i] = '\0';
}
```

4. (5p) Which reference could mean

- Follow the pointer in stemp to a structure (struct).
- Select the component named nums (this component is an array).
- Reference element 4 of the array.

a. stemp.nums[4]
b. *stemp.nums[4]
c. (*stemp).nums[4]
d. *(stemp.nums)[4]
e. none of the above

5. (5 p) Which of the following prototypes would be appropriate for a function whose purpose is to write to a text file the value of an array of structures of type bird_t? The function does not open the output file -- it assumes the file is already open.

a. `void print_bird_list(FILE *out_txtp, const bird_t list[]);`
b. `void print_bird_list(char *out_txtp, bird_t *list);`
c. `bird_t print_bird_list(char *out_txtp, double list[]);`
d. `FILE print_bird_list(FILE out_txtp, const bird_t list[]);`
e. none of the above

6. (20p) Write a function named file_large that takes as an input parameter a pointer to an open, nonempty binary file of integers, and returns as its value the largest integer in the file.

```
int file_large(FILE *fp)
{
    int large, new;
    fread(&large, sizeof (int), 1, fp);

    for (st = fread(&new, sizeof (int), 1, fp);
              st == 1;
              st = fread(&new, sizeof (int), 1, fp))
         if (new > large)
              large = new;
    return (large);
}
```

OR

```
int file_large(FILE *fp)
{
    int large, new, st;
    fread(&large, sizeof (int), 1, fp);
    st =fread(&new, sizeof (int), 1, fp);
    while (st == 1) // as long as it reads 1 element
    {
         if (new > large)
              large = new;
         st = fread(&new, sizeof (int), 1, fp);
    }
    return (large);
}
```

7. **(10p)** Assume the following type definition

```
typedef struct node_s {
          int  data;
          struct node_s *restp;
     } node_t;
```

Write a function display_list that takes a parameter of type node_t * and displays the data from each linked list element on a separate line.

```
void display_list(node_t *listp)
{
     if (listp != NULL) {
          printf("%4d\n", listp->data);
          display_list(listp->restp);
     }
}
```

8. **(20p)** Make a class definition that has a private integer variable named as "**inside**" and public access functions **int getValue()** and **void setValue(int).** Implement these functions. SetValue function only accepts positive values. Any other value discarded. Your class must also have a constructor that takes first value of inside variable.
After implementing your class create a pointer and normal example of your class in main function and use setValue and GetValue function for each example as appropriate.

```
#include <iostream>
using namespace std;

class MyClass
{
public:
    MyClass(int);
    int getValue();
    void setValue(int);
private:
    int inside;
};

MyClass::MyClass(int first)
{
    setValue(first);
}

int MyClass::getValue()
{
    return inside;
}

void MyClass::setValue(int val)
{
    if (val >= 0)
         inside = val;
}

int main(){
    MyClass c1(1), *c2;
    c2 = new MyClass(2);
    cout << c1.getValue() << endl;
    cout << c2->getValue() << endl;
    int value;
    cin >> value;
    c1.setValue(value);
    c2->setValue(value);
}
```