



No. of Pages : 4
No. Of Questions : 3
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CS143 Introduction to problem solving (Final Exam) (40 Points)

Question One

1. What is the return value of the following statement if it is placed in C program? (10 Points)
`strcmp("ABC", "ABC");`

- (a) 0
- (b) -1
- (c) 1
- (d) Compilation error

2. Choose a correct statement about C structures.

- (a) A structure can contain same structure type member.
- (b) A structure size is limited by only physical memory of that PC.
- (c) You can define an unlimited number of members inside a structure.
- (d) All the above.

3. Choose correct statement about Functions in C Language

- (a) Function is a group of c statements which can be reused any number of times.
- (b) Every Function has a return type.
- (c) Every Function may or may not return a value.
- (d) All the above.

4. A function which calls itself is called a ____ function.

- (a) Self Function
- (b) Auto Function
- (c) Recursive Function
- (d) Static Function

5. What is the file output of this program?

```
#include <stdio.h>
int main()
{
    FILE* pFile;
    char c;
    pFile = fopen("sample.txt", "wt");
    for (c = 'A'; c <= 'E'; c++) {
        putc(c, pFile);
    }
    fclose(pFile);
    return 0;
}
```

- (a) ABCD
- (b) ABC
- (c) ABCDE
- (d) None of the mentioned

6. What is the output of this program?

```
#include<stdio.h>

int main()
{
    int a[] = {1, 2, 3, 4, 5, 6};
    int *ptr = (int*)(&a+1);
    printf("%d ", *(ptr-1));
    return 0;
}
```

- (a) 1
- (b) 2
- (c) 6**
- (d) run time error

7. What is the output of the following C program.?

```
int main()
{
    struct book
    {
        int pages;
        char name[10];
    }a;
    a.pages=10;
    strcpy(a.name,"Cbasics");
    printf("%s=%d", a.name,a.pages);
    return 0;
}
```

- (a) Cbasics=10**
- (b) 10
- (c) Cbasics
- (d) run time error

8. What is the output of the following C Program.?

```
int main()
{
    int a[];
    a[4] = {1,2,3,4};
    printf("%d", a[0]);
}
```

Syntax Error

- (a) 1
- (b) 2
- (c) 4
- (d) Compiler error**

9. What is the output of the following C program.?

```
int main()
{
    char grade[] = {'A','B','C'};
    printf("GRADE=%d, ", *grade);
    printf("GRADE=%d", grade[0]);
}
```

- (a) A A
- (b) 65 A

→ 65
→ 65

(c) 65 65

(d) None of the above

10. What is the output of the following C Program with functions

```
void myshow(int);
void main()
{
    int a=10;
    printf("%d ", a); → 10
    myshow(a);
    printf("%d", a); → 10
}
void myshow(int k)
{
    k=20;
```

(a) 10 10

(b) 20 20

(c) 10 20

(d) Compiler error

Question Two

(10 Points)

Find the error in each of the following program segments and explain how the error can be corrected

a) <pre>int sum(int x, int y) { int result; result = x + y; }</pre> - has no return statement	b) <pre>int sum(int n) { if (n == 0){ return 0; } else { n + sum(n - 1); } }</pre> → Syntax Error return n + sum(n-1);
c) <pre>void product(void) { int a, b, c, result; printf("Enter three integers: ") scanf("%d%d%d", &a, &b, &c); result = a * b * c; printf("Result is %d", result); return result; }</pre>	d) <pre>char str[5]; scanf("%s", str); /* User types hello */</pre> ← char str[15]; logical Error
e) <pre>int a[3]; printf("Sd %d %d\n", a[1], a[2], a[3]);</pre> %d → logical Error Garbage	

Question Three

(20 Points)

1. Write a C program that construct an array of n elements entered by a user and build the following:
 - Write a **recursive function** (recursiveMinimum) that returns the smallest element value of the array
 - Write a **binary search** function (b_Search) to search about a value entered by a user

2. Define a **structure** for an Employee having EmployeeName, EmployeeCode, BasicPay, DearnessAllowance, HRA, PF, GrossPay, NetPay. Take an array of 10 Employees. Write 'C' functions to-:
 - a) Accept data for EmployeeName, EmployeeCode, BasicPay for all the employees.
 - b) Compute-:
 - a. DearnessAllowance = 50% of BasicPay
 - b. HRA = 20% of BasicPay + DearnessAllowance
 - c. PF = 12% of BasicPay + DearnessAllowance
 - d. GrossPay = BasicPay + DearnessAllowance + HRA
 - e. NetPay = GrossPay - PF
 - c) Display the name of employee who has highest GrossPay.
 - d) Compute and display average net pay.

3. Write a program to input name, address, telephone and salary amount of 'n' persons ($n \leq 20$). Sort according to the salary. Print the sorted array.

With my best wishes

```
#include<stdio.h>
#include<conio.h>
```

```
int min(int a,int b)
{
    if(a<b)
        return a;
    else
        return b;
}
```

```
int minArr(int arr[],int size)
{
    if(size==1)
        return arr[0];

    else
        return min(arr[size-1],minArr(arr,size-1));
}
```

```
void bubbleSort(int x[],int size)
{
    for(int i=0;i<size;i++)
    {
        for(int j=0;j<size-i-1;j++)
        {
            if(x[j]>x[j+1])
            {
                int temp=x[j];
                x[j]=x[j+1];
                x[j+1]=temp;
            }
        }
    }
}
```

```
int binarySearch(int x[],int size,int key)
```

```
{
```

```
    int low=0;
```

```
    int high=size-1;
```

```
    int mid;
```

```
    while(low<=high)
```

```
    {
```

```
        mid=(low+high)/2;
```

```
        if(key<x[mid])
```

```
            high=mid-1;
```

```
        else if(key>x[mid])
```

```
            low=mid+1;
```

```
        else
```

```
            return mid;
```

```
    }
```

```
    return -1;
```

```
}
```

```
int main()
```

```
{
```

```
    int x[100];
```

```
    int mySize;
```

```
    int key;
```

```
    int minElement;
```

```
    printf("Enter size : ");
```

```
    scanf("%d",&mySize);
```

```
    for(int i=0;i<mySize;i++)
```

```
    {
```

```
        printf("Enter num : ");
```

```
        scanf("%d",&x[i]);
```

```
    }
```

```
    minElement=minArr(x,mySize);
```

```
    printf("Enter key :");
```

```
    scanf("%d",&key);
```

```
    int index;
```

```
    bubbleSort(x,mySize);
```

```
index=binarySearch(x,mySize,key);
if(index==-1)
    printf("Not found\n");
else
    printf("Found @ index=%d\n",index);

printf("Minimum element =%d\n",minElement);

getch();
return 0;
}
```



```
C:\Users\yassen\documents\visual studio 2012\Projects\Project450\Debug\Project450.exe
Enter size : 10
Enter num : 5
Enter num : 9
Enter num : 4
Enter num : 3
Enter num : 8
Enter num : 1
Enter num : 6
Enter num : 88
Enter num : 7
Enter num : 24
Enter key :6
Found @ index=4
Minimum element =1
```