

Name:
UF ID:

CGS-3460 Fall 2007
Instructor: Manuel E. Bermudez
Midterm Exam
Maximum Points: 100
Time: 50 minutes

Problem 1 _____ (30 pts.)
Problem 2 _____ (20 pts.)
Problem 3 _____ (20 pts.)
Problem 4 _____ (30 pts.)
Total: _____ (100 pts.)

Instructions:

1. Attempt all the questions.
2. Keep your answers brief.
3. If you want, you can use the back side of the pages for your answers.
4. Write your name and UF ID on all the pages.

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Problem 1. Answer the following questions briefly (30 points)

(a) What is the value of the following expression in C?

```
(1<2)?1:2
```

1

(b) Is `int arr[3] = {0,1}` a valid initialization of the array `arr` ? If yes, then indicate the values of each element of `arr`. Otherwise indicate why this is invalid.

0 1 0

(c) Is it necessary for a recursive function to have a return type other than `void`? Why?

No, because recursion only requires that the function calls itself and nothing beyond that.

(d) Is the following a valid conditional statement in C? Explain why or why not. Assume that `a` is an integer variable.

```
if(a == 1 && 1 || 0)
```

Yes, because in C every integer other than 0 is TRUE and 0 is FALSE.

(e) What is the use of the `default` clause in a `switch` statement?

If the test variable does not match any of the defined cases, default statements, if present, will be executed and thus unexpected behavior of the program can be avoided.

(f) What is the difference between local and global variables?

Local variables are only available within the current block while global variable are available through out the program.

(g) What is the length of the longest valid string that can be stored in a character array declared as `char str[10]`? Why?

9 because the 10th character would have to be a '\0' for str to have a valid string

(h) If you use a function declared in `math.h` in your program (named `p1.c`), what command would you use to compile it?

gcc p1.c -lm

(i) What is the difference between `printf("%d", --i)` and `printf("%d", i--)`? You can assume `i` is an integer.

--i decrements i before printing its value while i-- decrements i after printing its value.

(j) What function can used to find out the amount of space in bytes that is occupied by a variable?
sizeof()

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Problem 2. Write down the output generated by following C program. Indicate spaces clearly.
(20 points)

```
#include<stdio.h>

void double_both(int a, int b)
{
    a = a * 2;
    b = b * 2;
    return ;
}

int double_a(int a)
{
    return a * 2;
}

float double_b(int b)
{
    b = b * 2.0;
    return b;
}

int main()
{
    int a=10,b=20;
    printf("%d %d\n",a,b);
    double_both(a,b);
    printf("%d %d",a,b);

    a = double_a(a);
    b = double_b(b);

    printf("%4f %4f\n",a,b);

    double_both(a,b);
    printf("%d %d\n",a,b);
}
```

Output:

```
10 20
10 200.000000 0.000000
20 40
```

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Problem 3. There are 4 errors in the following program. Locate them and indicate the necessary corrections. (20 points)

```
#include<stdio>
int main()
{
    int n;
    int i;
    printf("Enter an integer: ");
    scanf("%d",n);

    i=n;

    do
    {
        {
            printf("%d\n",i);
            i--
        }
    }while(i>0)
}
```

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Problem 4. Write a function (not a complete program) that computes and returns the sum of the elements of an array of integers, using recursion. (30 points)

```
int sum(int arr[], int c, int n)
{
    if(c>=n)
        return 0;
    else
        return arr[c] + sum(arr,c+1,n);
}
```