CS 301
Chapter 7/9/10
Assignment 3.
100 points.

Thomas crow
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1 (7.9). (5 points each, total 30 points)
Assume the following rules of associativity and precedence for expressions:

Precedence	*Highest*	*, /, **not***
		+ , − , &, **mod**
		- (unary)
		=, /=, <, <=, >=, >
		and
	Lowest	**or, xor**
Associativity	*Left to right*	

Show the order of evaluation of the following expressions by parenthesizing all subexpressions and placing a superscript on the right parenthesis to indicate order. For example, for the expression
*a + b * c +d*
*the order of evaluation would be represented as ((a + (b * c)1)2 + d)3*

a. $(((a * b)^1 - 1)^2 + c)^3$
b. $(((a * (b - 1)^1)^2 / c)^3 \bmod d)^4$
c. $(((a - b)^1 / c)^6 \,\&\, ((((d * e)^3 / a)^4 - 3)^5)^2)^7$
d. $(-a \text{ or } ((c = d)^1 \text{ and } e)^2)^3$
e. $(((a > b)^1 \text{ xor } c)^3 \text{ or } (d <= 17)^2)^4$
f. $(-(a + b)^1)^2$

2. (7.13) (10 points each, 20 points total)
Let the function fun be defined as

```
int fun(int*k) {
*k += 4;
return3 * (*k) - 1;
}
```

Suppose fun is used in a program as follows:

```
void main() {
int i = 10, j = 10, sum1, sum2;
sum1 = (i / 2) + fun(&i);
sum2 = fun(&j) + (j / 2);
}
```

What are the values of sum1 and sum2
a. operands in the expressions are evaluated left to right?
b. operands in the expressions are evaluated right to left?

A) sum1 = 46, sum2 = 48

B) sum1= 48, sum2 = 46

3. (7.19) (10 points each, total 20 points)
Consider the following C program:

```
int fun(int *i) {
*i += 5;
return 4;
}

void main() {
int x = 3;
x = x + fun(&x);
}
```

What is the value of x after the assignment statement in main, assuming:
a. operands are evaluated left to right.
X=7
b. operands are evaluated right to left.
X=12

4. (9.7) (5 points each, total 15 points)
Consider the following program written in C syntax:

```
void fun (int first, int second) {
  first += first;
  second += second;
}
void main() {
  int list[2] = {1, 3};
  fun(list[0], list[1]);
}
```

For each of the following parameter-passing methods, what are the values of the list array after execution?
a. Passed by value
b. Passed by reference
c. Passed by value-result

a) {1,3}

b) {2,6}

c) {1,3}

5. (10.1) Show the stack with all activation record instances (like Figure 10.9 on the textbokk), including static and dynamic chains, when execution reaches position 1 in the following skeletal program. Assume bigsub is at level 1. (15 points)

```
function bigsub() {
  function a() {
     function b() {
        ... <----------------------------1
     } // end of b
     function  c() {
       ...
       b();
       ...
     } // end of c
     ...
     c();
     ...
  } // end of a
  ...
  a();
  ...
} // end of bigsub
```

You can write your answers by hand, scan them, and upload them to Canvas as a single PDF file.
Please make sure your writing is clear and well organized.
There are no late submissions.