Final Exam Exercises

CS 1428
Spring 2020
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MC: Expressions

What is the value of the variable x after executing the following statement?

```java
float x = 13/4;
```

(a) 3.25  
(b) 3.3  
(c) 3.0  
(d) 1.75

MC: Function Calls

You have the following function prototype in your program:

```java
void factorial(int);
```

given: `int x; int factor;` in main, indicate if the following function calls in main are valid or not.

1. `factorial(17);`  
   (a) valid  (b) not valid
2. `factorial(x);`  
   (a) valid  (b) not valid
3. `factorial(factor-17);`  
   (a) valid  (b) not valid
4. `x = factorial(100);`  
   (a) valid  (b) not valid

T/F: Scope

If a variable named x is defined in function main:

1. You cannot have a variable named x in another function.     (a) true  (b) false
2. You cannot declare another variable named x inside main (unless it is inside a nested block).     (a) true  (b) false
3. You cannot declare a parameter named x in another function.     (a) true  (b) false
4. You cannot declare a variable named x that is global to all functions.     (a) true  (b) false
Values of Expressions

What is the value of the following expressions?

```c
int i, j = 6, k = 2; //given this
```

1. \(28 / 4 - k\)
2. \(j + 12 * k - 8\)
3. \(j + 17 \% 3 - k\)
4. \(k + 22 * (9 - 7)\)
5. \(12 / (10 - j)\)
6. \((19 - 3) * (k + k) / 4\)
7. \(i = 38.9; //what is stored in i?\)
8. \(k > 0 && false\)  (a) true  (b) false  (c) unknown  (d) error
9. \(k > 0 || k < 10\)  (a) true  (b) false  (c) unknown  (d) error
10. \(k < 0 || k > 10\)  (a) true  (b) false  (c) unknown  (d) error

Tracing #1

What is output by the following program?

```c
int fun(int &x, int y) {
    x = 3;
    y = 4;
    return 5;
    x++;
}
int main() {
    int a = 1, b = 2, c = 3;
    c = fun(a, b);
    cout << a << " " << b << " " << c;
}
```

(a) 1 2 3  (b) 3 4 3  (c) 3 4 5  (d) 3 4 6  (e) 3 2 5

Tracing #2

What is output by the following program?

```c
const int SIZE = 5;
void sky(int a[ ]) {
    a[1] = 25;
    a[SIZE-1] = 66;
}
int main() {
    int nums[SIZE] = {1,2,3,4,5};
    sky(nums);
    for (int i=0; i<SIZE; i++)
        cout << nums[i] << " ";
    cout << endl;
}
```

(a) 1 2 3 4 5  (b) 25 2 3 66 5  (c) 1 25 3 66 5  (d) 1 25 3 66 5  (e) 25 2 3 4 66

Find the errors

This function that should calculate and return the average of three integers. Rewrite the function to fix the errors in the function definition.

```c
double average(int value1, int value2)
{
    average = value1 + value2 + value3 / 3;
}
```
Programming: Chapter 2

Convert the following pseudocode to C++ code. Be sure to declare the appropriate variables:
- Store 172.5 in the force variable.
- Store 27.5 in the area variable.
- Divide area by force and store the result in the pressure variable.
- Display the contents of the pressure variable.

Programming: Chapter 3

Write a program that asks the user to enter a golfer’s score for three games of golf, and then displays the average of the three scores.

Programming: Chapter 4

Using the following chart, write a nested if/else statement that assigns .10, .15, or .20 to commission, depending on the value in sales. Try not to use any redundant boolean expressions in your if/else statement.

<table>
<thead>
<tr>
<th>Sales</th>
<th>Commission Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Under $10,000</td>
<td>10%</td>
</tr>
<tr>
<td>$10,000 to $15,000</td>
<td>15%</td>
</tr>
<tr>
<td>Over $15,000</td>
<td>20%</td>
</tr>
</tbody>
</table>

Programming: Chapter 5

A. Write a for loop that displays the following set of numbers: 0, 10, 20, 30, 40, 50 ... 1000

B. Write a code segment that asks the user to “enter a series of positive numbers, then enter a -1 when finished.” Your code should compute and output the sum of the numbers (do not include -1 in the sum).
Programming: Chapter 6

A. The following statement calls a function named half. The half function returns a value that is half that of the argument. Write the function.

```
result = half(number);
```

B. Write a function named getNumber that uses a reference parameter variable to accept an integer argument. The function should prompt the user to enter a number in the range of 1 through 100. The input should be validated and stored in the parameter variable.

Programming: Chapter 7

A. The arrays numberArray1 and numberArray2 have 100 elements. Write code that copies the values in numberArray1 to numberArray2.

B. Write a program that lets the user enter ten values into an array. The program should then display the largest and smallest values stored in the array.

C. In a program, write a function that accepts three arguments: an array, the size of the array, and a number n. Assume the array contains integers. The function should display all of the numbers in the array that are greater than the number n.

Programming: Chapter 11

The structure Car is declared as follows:
```
struct Car {
    string carMake;
    string carModel;
    int yearModel;
    double cost;
};
```

A. Define an array of 35 of the Car structure variables. Initialize the first three elements with the following data:

<table>
<thead>
<tr>
<th>Make</th>
<th>Model</th>
<th>Year</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ford</td>
<td>Taurus</td>
<td>1997</td>
<td>$21,000</td>
</tr>
<tr>
<td>Honda</td>
<td>Accord</td>
<td>1992</td>
<td>$11,000</td>
</tr>
<tr>
<td>Lamborghini</td>
<td>Countach</td>
<td>1997</td>
<td>$200,000</td>
</tr>
</tbody>
</table>

B. Write a loop that will step through the array you defined in Question A, displaying the contents of each element.