

Final Exam Exercises

CS 1428
Fall 2015

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MC: Expressions

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

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

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

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MC: Function Calls #1

You have the following function prototype in your program:

```
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

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MC: Function Calls #2

You have the following function prototype in your program:

```
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

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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

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Values of Expressions

What is the value of the following expressions?

```
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

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Tracing #1

What is output by the following program?

```
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

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Tracing #2

What is output by the following program?

```
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 4 66
(e) 25 2 5 4 66

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Find the errors

What is one of the errors in the following function that should calculate and return the average of three integers?

```
double average(int value1, int value2)
{
    average = value1 + value2 + value3 / 3;
}
```

- (a) The return type should be int
- (b) The types of value1 and value2 must be double.
- (c) The function name cannot be the same as a local variable.
- (d) value1+value2+value3 must be placed inside of ().

Note there are at least 3 more errors . . .

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Short Programming Problem

Write a function named bigNums that has two parameters: an array of integers and the size of the array. The function should return a count of the number of elements in the array greater than 1000.

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Long Programming Problem

Write a program that stores the following data about a breakfast item for sale at a diner:

- Description
- Price

The program should keep an array of 8 of these structures, one for each item on the menu. When the program runs it should display the menu (with prices) to the user, and allow the user to select multiple items from the menu (by number). The program should calculate and display the total cost of the items selected, along with the tax (7%) and the total amount due. See the next slide for sample output.

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Sample output

```
[1] Plain Egg...$1.45
[2] Bacon and Egg...$2.45
[3] Muffin...$0.99
[4] French Toast...$1.99
[5] Fruit Basket...$2.49
[6] Cereal...$0.69
[7] Coffee...$0.50
[8] Tea...$0.75
```

You may enter a number more than once to place multiple orders.
When you are done, type 0 to print your tax and total.

```
2
2
7
8
0
Subtotal...$6.15
Tax...$0.43
Amount Due...$6.58
```

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