

## Final Exam Exercises

CS 1428  
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1

## 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

2

## 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

3

## 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

4

## 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

5

## 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

6

## 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

7

## 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

8

## Find the errors

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

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

9

## Programming Problem

### Chapter 2.4: Restaurant Bill

Write a program that computes the tax and tip on a restaurant bill for a patron with a \$88.67 meal charge. The tax should be 6.75 percent of the meal cost. The tip should be 20 percent of the total after adding the tax. Display the meal cost, tax amount, tip amount, and total bill on the screen.

10

## Programming Problem

### Chapter 3.6 Ingredient Adjuster

A cookie recipe calls for the following ingredients:

- 1.5 cups of sugar
- 1 cup of butter
- 2.75 cups of flour

The recipe produces 48 cookies with this amount of the ingredients. Write a program that asks the user how many cookies he or she wants to make, and then displays the number of cups of each ingredient needed for the specified number of cookies.

11

## Programming Problem

### Chapter 4.9 Change for a Dollar Game

Create a change-counting game that gets the user to enter the number of coins required to make exactly one dollar. The program should ask the user to enter the number of pennies, nickels, dimes, and quarters. If the total value of the coins entered is equal to one dollar, the program should congratulate the user for winning the game. Otherwise, the program should display a message indicating whether the amount entered was more than or less than one dollar.

12

## Programming Problem

### Chapter 5.6 Distance Traveled

The distance a vehicle travels can be calculated as follows:

distance = speed \* time

For example, if a train travels 40 miles per hour for 3 hours, the distance traveled is 120 miles.

Write a program that asks the user for the speed of a vehicle (in miles per hour) and how many hours it has traveled. The program should then use a loop to display the distance the vehicle has traveled for each hour of that time period. Here is sample output:

```
What is the speed of the vehicle in mph? 40
How many hours has it traveled? 3
Hour Distance Traveled
-----
```

```
1 40
2 80
3 120
```

13

## Programming Problem

### Chapter 6.5 Falling Distance

When an object is falling because of gravity, the following formula can be used to determine the distance the object falls in a specific time period:

$d = 1/2 gt^2$  (one half g times t squared)

The variables in the formula are as follows: d is the distance in meters, g is 9.8, and t is the amount of time, in seconds, that the object has been falling.

Write a function named `fallingDistance` that accepts an object's falling time (in seconds) as an argument. The function should return the distance, in meters, that the object has fallen during that time interval. Write a program that demonstrates the function by calling it in a loop that passes the values 1 through 10 as arguments and displays the return value.

14

## Programming Problem

### Chapter 7.5 Driver's License Exam

The local Driver's License Office has asked you to write a program that grades the written portion of the driver's license exam. The exam has 20 multiple choice questions. Here are the correct answers:

1. A 2. D 3. B 4. B 5. C 6. B 7. A 8. B 9. C 10. D  
11. A 12. C 13. D 14. B 15. D 16. C 17. C 18. A 19. D 20. B

Your program should store the correct answers in an array. It should ask the user to enter the student's answers for each of the 20 questions, and the answers should be stored in another array. After the student's answers have been entered, the program should display a message indicating whether the student passed or failed the exam (a score of at least 15 is required to pass the exam.) It should then display the total number of correctly answered questions, the total number of incorrectly answered questions, and a list showing the question numbers of the incorrectly answered questions.

15

## Programming Problem

### Chapter 11.4 Weather Statistics

Write a program that uses a structure to store the following weather data for a particular month:

Total Rainfall

High Temperature

Low Temperature

Average Temperature

The program should have an array of 12 structures to hold weather data for an entire year. When the program runs, it should ask the user to enter the total rainfall, and high and low temperature for each month. The average temperature should be calculated from this data. Once the data are entered for all the months, the program should calculate and display the average monthly rainfall, the total rainfall for the year, the highest and lowest temperatures for the year, and the average of all the monthly average temperatures.

16