

Practice Final

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The final exam will be a closed-book paper exam without a calculator. Exam questions will be similar in type to those found here, but fewer in number. While this practice exam is a good study guide, we highly recommend being familiar with *all the material* (including but not limited to your previous exams, labs, projects, quizzes and homework) as well.

1 Problem 0 (Warm-up)

1. What is the escape sequence for a new line?
2. What is the return type of a constructor?
3. List 4 datatypes.
4. What is the difference between a variable and a constant?
5. In an exam class, if I want to keep track of the total number of exams should the attribute be static or non-static?
6. Write a condition that evaluates to true if an int length is between 4 and 16, both inclusive.
7. Write a statement or statements that creates an int array of size 50 with each index containing that index as its value. (i.e. 0 at [0], 13 at [13], 49 at [49], etc.).
8. Write a statement or statements to create a random number generator called examRand and use it to generate a random number between 40 and 57 (inclusive).

2 Problem 1

Consider the code below:

```
class VirtualPet{
    private string name = "Blank";           // Name of the pet.
    private decimal hungerLevel = 1m;       // Level of hunger, with 1 being
    ↪ full, in percent.
    private decimal happinessLevel = 1m;    // Level of happiness, in percent

    public void SetName(string nameP)
    {
        name = nameP;
    }
}
```

1. Write a statement to instantiate a `VirtualPet` object called `firstPet`.
2. Write a getter for the `name` attribute.
3. Write a setter for the `hungerLevel` attribute that takes one decimal. The argument should be assigned to the `hungerLevel` attribute only if it is between 0 and 1 (both included), otherwise the attribute should get the value 0.
4. Draw the UML diagram for the `VirtualPet` class, including the methods you just added.
5. Write a constructor that takes 3 arguments (`string`, `decimal`, `decimal`) for the `VirtualPet` class. Your constructor should be such that if one of the decimal arguments is not between 0 and 1 (both included), then 0 gets assigned to both decimal attributes.
6. Your earlier statement that created the `firstPet` object will no longer compile after you add the constructor. Why is this the case?
7. Write a `ToString` method for the `VirtualPet` class. It should display the `name`, `hungerLevel`, and `happinessLevel`. (Bonus) Display `hungerLevel` and `happinessLevel` graphically: for instance, if `hungerLevel` is at 4.5, display "Hunger: XXXX". You may freely use symbols as if they were normal letters.
8. Write a statement that would use the `ToString` method from the `VirtualPet` class you just added to display information about the `secondPet` object.

3 Problem 2

This question will have you partially design, implement and use class to represent hamburgers. A Burger has a name, a price, a Boolean for dairy, and a type (typically beef, pork, chicken, veggie).

1. Draw the UML diagram for the `Burger` class, assuming it contains the listed attributes, a getter for the `name` attribute and a setter for the `price` attribute. Do not include any other methods.
2. Write a setter for the `price` attribute.
3. Write an additional constructor that takes a name, a dairy, and a type. The price should then be set according to the following table. If the value for type is not in the table, price should be set to -99.99.

4. Write a static method Promotion that takes as an argument a price and returns a value 75% of the argument.
5. Write a ToString method. The string returned should contain the values of all attributes.

4 Problem 3

Complete the table based on the code.

x	y	z	Displays
-1	'e'	18.2M	
-1	'a'	-2	
0	'c'	4.6M	
1	'd'	2	
-1	'b'	115	
1	'd'	-33.7M	
0	'a'	0	
1	'c'	13	
			5

```
int x;
char y;
decimal z;

// x, y, and z are given legal values

if(x<0 && y == 'a'){
    Console.WriteLine("1");
}
else if(z%2==0){
    Console.WriteLine("2");
}
else if(y=='c' || y=='d'){
    Console.WriteLine("3");
}
else if(x!=0 && z!=0){
    Console.WriteLine("4");
}
else{
    Console.WriteLine("5");
}
```

5 Problem 4

Given two int arrays of equal length, write a code segment that compares the values at each index to see if they match. Return the total number of matches.

6 Problem 5 (Deceptively hard)

Given two string arrays (array A and array B) of unknown (possibly different) lengths, determine if there are any values found in both A and B. If they exist, display them to the screen. At the end of the program, display the total number of common values between A and B. If there are repeating values in either or both arrays, each should only be counted once.

(Bonus): How could Lists be used to make this problem easier?

7 Problem 6

Write a program that declares an int variable called "pin" and asks the user for their pin. As long as the user enters something that is not a number, is negative, or greater than 9999, your program should ask again.

(Bonus): Your code should make sure that the pin has exactly 4 digits, including leading zeros.

8 Problem 7

1. Write a statement that would create an int array of size 100.
2. Write a series of statements that would ask the user to enter a value for each cell in the array (no need to perform user-input validation, but you may if you like).
3. Write a series of statements that would ask the user to enter a value, displaying "In your array" if the value is in your array.
4. Write a series of statements that would display the sum of values in the array.
5. Write a series of statements that would display the product of all the non-zero values in the array.
6. Write a series of statements that would display the smallest index of the greatest value in the array.