Final Exam Review

Part I Java

1. Describe why using private type variables in superclass could benefit software.
2. What is polymorphism? What benefit can it bring?
3. Know the concept of Abstract class, Concrete class, and their difference; Abstract method, Concrete method; Abstract class hierarchy
4. Be able to declare abstract class and method
5. Know whether abstract superclasses can be used to declare variables. If yes, can such variables hold references to objects of the superclass? Can such variables hold references to objects of concrete subclasses derived from the superclass?
6. Can a Final method in a superclass be overrided in subclasses?
7. Can a superclass variable invoke methods declared in subclasses?
8. Know the concept of Runnable object and Run method in the context of multithread programming
9. Can you predict the order in which multiple threads are executed?
10. Thread synchronization coordinates access to shared mutable data by multiple concurrent threads, and know how to use the Synchronized statement to achieve mutual exclusion

Part II PHP + MySQL

1. Understand that PHP is a server-side scripting language, i.e. where PHP code is executed
2. Know what the general result of PHP code is, namely HTML page which is returned to the browser
3. Know the structure of and be able to write a basic PHP page. I.e. know how to write stand-alone PHP code or insert PHP code into HTML using the <?php … ?> tag
4. Know how to declare variables of type string, integer, and array (two types of array as shown in *c* and *d* below) and know how to access values from arrays
    a. $myString = “foo”;
    b. $myInt = 10;
    c. $myNumArr = array(“first”, “second”, “third”)
    d. $myAssocArr = array(“first” => 10, “second” => 20, “third” => 30);
5. Given a set of string operation methods, e.g., strlen()), be able to implement a certain required logic based on those methods.
6. Be able to declare a PHP function, especially remembering that the “function” keyword is required, and use “echo” to output to the browser in the function
7. Know how to include one PHP file into another PHP file using the *include()* statement
8. Know how to add a file download link into HTML page through the *href* method.
9. Know what a cookie is, where it is stored, and why and how one might be used (created by setcookie() and retrieved by the $_COOKIE array)

10. Know what a session is, how it is maintained (by the server, which generates a unique ID for new connections from a given browser), what data structure can be used to hold session data in PHP (the $_SESSION array), and how to create a session (session_start()).
11. Understand what is meant by form validation, and understand how PHP form validation can be used (you won't necessarily need to write form validation code, but you should understand how it works)
12. Know the MySQLi statement to connect to a database, and how to check whether the connection failed.
13. Know how to create a sql for creating a database. Given such as sql, know what database is created.
14. Know how to create a sql for creating a table in a database. Given such a sql, be able to analyze the structure of the table, e.g., which columns it has.
15. Know how to use SELECT and/or WHERE to create sqls for conditioned query, and understand a sql statement that contains SELECT and/or WHERE.
16. Be able to analyze a relatively complex PHP page and determine what it will output when given a variety of input values (e.g. via form, query strings, cookies, and sessions)

Part III Python

1. Know that Python code is interpreted, not compiled and run.
2. Be able to write a very simple Python program with printed output, and add comments to it
3. Be able to define a variable and assign value to it
4. Be able to do string multiplication and string concatenation
5. Be able to write for loops under given range and step size
6. Be able to define simple functions with/without default parameters, and be able to implement a simple function
7. Understand and be able to use nonnegative and negative indexes for strings, arrays, and list
8. Be able to use a for loop to examine each character in a string
9. Be able to get input from user
10. Know the two ways to generate random number, randint() and choice()
11. Know how to define a tuple and access its values, and how to use tuple to return multiple values from a function
12. Know read(), readline(), readlines(), and for line in file("filename")
13. Know how to write and append to file
14. Know how to define a list, access its values, and get a sublist/slice of it
15. Know how to split a string using split() and split(delimeter)
16. Know how to declare a method and access instance variables inside a class (the self. keyword) , and know the name of constructor function
17. Tuple and string are immutable (you cannot change one element only unless change the whole tuple/string), but list is mutable where you can change any element.
18. Use the "in" operator to check whether a value is in a container
19. Know how to define a dictionary and access its elements.