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1. We should use packages to classify the java class files and default package should not be used.
2. Class have fields and methods. Both of them can be instance or static.
3. Static methods cannot invoke instance variables or instance methods. While instance methods can modify static variables.
4. Methods can be overridden to fulfil polymorphism.
5. Generally, variables in a class are usually private. This is good for information hiding.
6. StringBuffer, StringBuilder shall be used instead of String, when the string are likely to change.
7. File IO can be achieved via streams. Text files can be read and write by text streams, and binary files can be read and write by binary streams.
8. Most times, we can utilize wrapper class, like BufferedReader and BufferedInputStream to the operation more friendly to programmers.
9. Exceptions may happen in the program. If some kinds of errors can be foreseen, those errors can be handled simply by if clause. However, some errors are difficult to predict, and these require exception handling provided by JVM.
10. Exception handling consists ‘try catch’ and optionally ‘finally’ statement. If exceptions happen in the try block, then the exception will be threw and caught by the following catch block. In the catch block, we can do some stack check or recovery to handle the exception.
11. Except for the system provided exceptions, users can define their own exception called customer exception. Customer exception extends Exception and has its own error number and error message. What's more, users can define their own fix methods in the exception to make the system self-healing.
12. Class diagram is a good tool to design a project. It clearly shows the responsibilities and collaborations among classes.
13. Java Coding convention is important, which makes the program more readable. With good code style, programs are easy to understand and modify.
14. If a class are only used or exist in another class, it should be declared as an inner class.
15. Inner class have full access to the outer class, while outer class cannot access private fields and methods in the inner class.
16. Private inner class can be instantiated by providing the outer class name.
17. Serialization is a good way to export and import object directly.
18. Hard code shall be prevented. Hard code makes the program hard to understand and reuse.
19. Java collection framework provides us with several data structures to CRUD data, including List, Set, Map as higher level interface and ArrayList, LinkedList, HashSet, TreeSet, HashMap, TreeMap as lower level implementations.
20. Interface, abstract class are a good way to encapsulate information and hide information, which makes program extensible.
21. Containment is to contain other objects inside a class itself. Encapsulation is about information hiding. In project 1, the encapsulated Optionset and Option are contained in the Automobile class as inner classes.
22. One way to analyze data is to list all of the concept and figure out the relationships between them.
23. The concept which could be represented by only one simple string or a primitive data type is not suitable to be defined as an independent class.
24. If a concept will be described by several attributes or has very definite responsibility in the domain, it should be declared as a class.
25. If a class associates with another class in some way, we say that they have some kind of coupling. If a class has a unique responsibility or functionality, we say that there is some cohesion.
26. A good design should be in low coupling and high cohesion, which means that each class depends as less as possible on other classes, and each class has definite responsibilities that are not interleaved with other classes.
27. One strategy to design core class for future use is to use interfaces and abstract class.
28. Do not use hard code.
29. Reasonably split the code block and make some comments are good ways to make java class readable.
30. The advantage to read data from a txt in a single pass is that it saves memory. The disadvantage is that it is not efficient as the buffering way.
31. Serialization is good for storing metadata. Code is clear and easy to use. When serializing with inner class, the inner class should also be serializable.
32. Encapsulation can be used when preventing access to properties and methods. Association can be used when passing an object by reference. Containment can be used when creating an instance of one object inside another. Inheritance can be used when passing functionality from parent to child class. Polymorphism can be used where one method has many meanings.
33. Using inner class can make class self-contained and independent.
34. An interface provides the rules and method to interact with the existing system when building an API.
35. Providing API is the best way to create a framework, exposing a complex product and make it extensible.
36. Creating an abstract class and contains only interfaces implementations make it highly extensible, since the method are declared only in one class and can be extends by another class.
37. Use different interfaces to expose methods can make the application more extensible and it is good encapsulation.
38. Exception handling should be located in one package, providing customer exception and its handling. Delegate the self-healing methods to other classes accessed through interface.
39. Exposing fix methods can make the application more stable.
40. A static object in ProxyAutomobile is a singleton, which can only be instantiated once and shared by several children class.
41. Choice variable in the Optionset class records the option choice that a user made. For exposing the choices in the Auto, we need getter methods.
42. When implementing LHM for Auto, I added another class called Fleet and implement all the CRUD methods in the Fleet class. The Fleet class is contained in the ProxyAutomobile as a singleton.
43. Make a class extends Thread or implements Runnable and override the run() method. When we want to create a thread to run, we simply call start().
44. Synchronize the shared object in multi-threading.
45. Without synchronization, there will be race condition. With synchronization, there may be dead lock and starvation.
46. Dead lock and starvation can be solved by properly using wait() and notify().
47. Synchronization can also cause the system performs less efficient.
48. Client and server can communicate via socket.
49. The server accepts the request from client and should handle it in a separate thread in order to listen to other clients’ requests.
50. Client and server shall communicate with certain protocol, which means the first line we sent via socket should specify the required methods, resource and protocol, with optional data from client to server.
51. Properties file is programmer friendly. It can be loaded as a properties object and easy to get the data with items.
52. We can use object streams between client and server, which makes the communication unified.
53. One layer Client-Server system cannot meet all requirements. So we build a Web browser-Client-Server system for car configuration.
54. Web browser connects to a host via http connection. It can locate static resource like html file or dynamic file such as servelet and JSP.
55. Servelet is small application running on the server. It extends HttpServelet and has doGet and doPost method, taking request and response as parameter.
56. Once a client connects to a server, it opens a session. Several requests can happen during a session.
57. One servelet can pass parameters to another by set and get attributes.
58. Request can be forwarded to another resource by calling dispatcher.
59. JSP is html+java. It can embed java code in the html text so that it shows users with dynamic web page.
60. Database should be built based on the three normalization rules.
61. JDBC can connect to database from eclipse platform, which enables programmers to manipulate database using java code to send SQL instructions.