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Chapter: Chapter 01 - Quiz

Multiple Choice

1. Java programmers define their own exceptions by _____ the library's Exception class.
A) throwing
B) raising
C) implementing
D) extending
E) None of these is correct.
Ans: D
Complexity: Moderate
Ahead: Exceptional Situations
Subject: Chapter 1

2. Which of the following represents "exponential" time?
A) O(2N)
B) $O(N^2)$
C) $O(2^N)$
D) $O(N^9)$
E) None of these is correct.
Ans: C
Complexity: Easy
Ahead: Comparing Algorithms: Order of Growth Analysis
Subject: Chapter 1

3. The order of growth efficiency of the function $3N^3 + 17N^2$ is:
A) O(3N).
B) $O(3N^3)$.
C) O(17).
D) $O(N^2)$.
E) None of these is correct.
Ans: E
Complexity: Easy
Ahead: Comparing Algorithms: Order of Growth Analysis
Subject: Chapter 1

4. A protected variable:
1) is only visible inside the class within which it is defined.
2) cannot be changed.
3) can be read from anywhere but can only be changed by code inside the class within which it is defined.
4) can be changed by code in another class.
5) is visible inside the class within which it is defined, or within its package, or within classes derived from its class.
<Answer: 5>
<Complexity: Easy>
<A-head: Classes, Objects, and Applications>
<Subject: Chapter 1>

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5. Polymorphism means:
1) many objects can be instantiated from a single class definition.
2) an object variable might reference objects of different classes at different times.
3) methods like `toString` can be defined in many different classes.
4) a class can extend multiple other classes.
5) None of these is correct.
<Answer: 2>
<Complexity: Moderate>
<A-head: Organizing Classes>
<Subject: Chapter 1>

6. When handling an exception explicitly, it is best to do so:
1) at the lowest level of abstraction that can recover from the error.
2) at the highest level of abstraction possible.
3) as soon as the exception is discovered.
4) in the main program.
5) None of these is correct.
<Answer: 1>
<Complexity: Moderate>
<A-head: Exceptional Situations>
<Subject: Chapter 1>

7. This structure is the best model for describing the chapters and sections and subsections of a textbook.
1) Array
2) Map
3) Stack
4) Queue
5) Tree
<Answer: 5>
<Complexity: Easy>
<A-head: Data Structures>
<Subject: Chapter 1>

8. In Java, method arguments are passed by:
1) value.
2) reference.
3) creating a copy of the argument and passing it.
4) using an array.
5) None of these is correct.
<Answer: 1>
<Complexity: Moderate>
<A-head: Basic Structuring Mechanisms>
<Subject: Chapter 1>

9. Put these order of growth efficiency functions in order from most efficient to least efficient: n^3, 2^n, $n^2\log_2 n$, n^2, 1, n^7
1) 1, $n^2\log_2 n$, n^2, n^3, 2^n, n^7
2) n^3, 2^n, $n^2\log_2 n$, n^2, 1, n^7

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3) 1, $n^2 \log_2 n$, n^2, n^3, n^7 ,2^n
4) 1, n^2, $n^2 \log_2 n$, n^3, n^7 ,2^n
5) None of these is correct.
<Answer: 4>
<Complexity: Difficult>
<A-head: Comparing Algorithms: Order of Growth Analysis>
<Subject: Chapter 1>

10. What are the two basic structuring mechanisms described in the text?
1) The reference and the array
2) The array and the primitive variable
3) The stack and the queue
4) Objects and classes
5) None of these is correct.
<Answer: 1>
<Complexity: Moderate>
<A-head: Basic Structuring Mechanisms>
<Subject: Chapter 1>

11. This Java statement is used to “announce” that an exception has occurred.
1) Throw
2) Raise
3) Catch
4) Try
5) None of these is correct.
<Answer: 1>
<Complexity: Moderate>
<A-head: Exceptional Situations>
<Subject: Chapter 1>

12. Direct addressing is to indirect addressing as (indicate the best match):
1) subclass is to superclass.
2) primitive variable is to reference variable.
3) memory address is to memory address contents.
4) constant is to variable.
5) public is to private.
<Answer: 2>
<Complexity: Moderate>
<A-head: Basic Structuring Mechanisms>
<Subject: Chapter 1>

13. This structure is the best model for a group of customers waiting to check out in a grocery store.
A) Array
B) Map
C) Stack
D) Queue
E) Tree

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Ans: D
Complexity: Easy
Ahead: Data Structures
Subject: Chapter 1

True/False

14. True or False? The following code results in garbage being created.

```
Circle c1 = new Circle(8);
Circle c2;
```

Ans: False
Complexity: Moderate
Ahead: Basic Structuring Mechanisms
Subject: Chapter 1

15. True or False? The following code results in garbage being created.

```
Circle c1 = new Circle(8);
Circle c2;
c2 = c1;
```

Ans: False
Complexity: Moderate
Ahead: Basic Structuring Mechanisms
Subject: Chapter 1

16. Java supports single inheritance only, i.e., a class can only directly inherit from a single superclass.
<Answer: True>
<Complexity: Easy>
<A-head: Organizing Classes>
<Subject: Chapter 1>

17. It is usually better for a program to “bomb” than to produce erroneous results.
<Answer: True>
<Complexity: Easy>
<A-head: Exceptional Situations>
<Subject: Chapter 1>

18. A tree child element can only have a single parent.
<Answer: True>
<Complexity: Easy>
<A-head: Data Structures>
<Subject: Chapter 1>

19. $(N + 1)(3N^3 + 5N^2 + 27N + 17)$ is $O(N^4)$
<Answer: True>
<Complexity: Easy>
<A-head: Comparing Algorithms: Order of Growth Analysis>
<Subject: Chapter 1>

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20. A private variable cannot be accessed from anywhere.
<Answer: False>
<Complexity: Easy>
<A-head: Classes, Objects, and Applications>
<Subject: Chapter 1>

21. A class definition can be used to create multiple objects.
<Answer: True>
<Complexity: Easy>
<A-head: Classes, Objects, and Applications>
<Subject: Chapter 1>

22. A queue is a first in, first out structure.
<Answer: True>
<Complexity: Easy>
<A-head: Data Structures>
<Subject: Chapter 1>

23. A tree element can only have one successor.
<Answer: False>
<Complexity: Easy>
<A-head: Data Structures>
<Subject: Chapter 1>

24. True or False? The Unified Method was the brainchild of a single software engineer, Grady Booch.
Ans: False
Complexity: Easy
Ahead: Classes, Objects, and Applications
Subject: Chapter 1

25. True or False? Subclasses are assignment compatible with the superclasses above them in the inheritance hierarchy.
Ans: True
Complexity: Moderate
Ahead: Organizing Classes
Subject: Chapter 1

Short Answer

26. Java programmers define their own exceptions by _____ the library's Exception class.
Ans: extending
Complexity: Moderate
Ahead: Exceptional Situations
Subject: Chapter 1

27. The array and the _____ act as building blocks for many other structures.
Ans: linked list
Complexity: Moderate
Ahead: Data Structures

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Subject: Chapter 1

28. A(n) _____ data structure is made up of a set of elements, usually called nodes or vertices, and a set of edges that connect the vertices, with no restrictions on the connections between the elements.
Ans: graph
Complexity: Moderate
Ahead: Data Structures
Subject: Chapter 1

29. O(n) is called _____ time.
Ans: linear
Complexity: Easy
Ahead: Comparing Algorithms: Order of Growth Analysis
Subject: Chapter 1

30. $O(n^2)$ is called _____ time.
Ans: quadratic
Complexity: Easy
Ahead: Comparing Algorithms: Order of Growth Analysis
Subject: Chapter 1

31. $O(\log_2 n)$ is called _____ time.
Ans: logarithmic
Complexity: Easy
Ahead: Comparing Algorithms: Order of Growth Analysis
Subject: Chapter 1

32. The _____ Award was presented to Nygaard and Dahl in 2001 for their seminal work on object-orientation.
<Answer: Turing>
<Complexity: Moderate>
<A-head: Classes, Objects, and Applications>
<Subject: Chapter 1>

33. In Java, the _____ class is the root of the inheritance tree.
<Answer: `Object`>
<Complexity: Moderate>
<A-head: Organizing Classes>
<Subject: Chapter 1>

34. The _____ method of the `Object` class returns a string representing some of the internal system implementation details of the object.
<Answer: `toString`>
<Complexity: Difficult>
<A-head: Organizing Classes>
<Subject: Chapter 1>

35. Using the `IncDate` class defined in the text, the output from the following code is _____.

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```
Date date1 = new IncDate(1, 2, 2005);
Date date2 = new IncDate(1, 2, 2005);
date1 = date2;
date1.increment();
if (date1 == date2)
{
  System.out.println("equal");
}
else
{
  System.out.println("not equal");
}
```

Ans: `equal`
Complexity: Moderate
Ahead: Basic Structuring Mechanisms
Subject: Chapter 1

36. $O(2^n)$ is called _____ time.
Ans: exponential
Complexity: Easy
Ahead: Comparing Algorithms: Order of Growth Analysis
Subject: Chapter 1

37. In the best case, a sequential search of an array with 1,000 elements requires this many comparisons: _____.
Ans: 1
Complexity: Difficult
Ahead: Comparing Algorithms: Order of Growth Analysis
Subject: Chapter 1

38. When we assign one object to another object, using =, we say we have created a(n) _____ for the object.
Ans: alias
Complexity: Moderate
Ahead: Basic Structuring Mechanisms
Subject: Chapter 1

Essay

39. What are the three key elements featured by the Unified Method, as described in the text?
Ans: It is use-case driven. It is architecture-centric. It is iterative and incremental.
Complexity: Difficult

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Ahead: Classes, Objects, and Applications
Subject: Chapter 1

40. Explain the statement: “Subclasses are assignment compatible with the superclasses above them in the inheritance hierarchy.”
Ans: This means that an object of the subclass can be assigned to a variable that is declared to be of the superclass type. The subclass object is a superclass object, but not the other way around.
Complexity: Difficult
Ahead: Organizing Classes
Subject: Chapter 1

41. Describe how/when garbage is created.
Ans: Garbage is created when the last reference to an object from within an application is removed due to reassignment. If there are no useable references to an object, then it cannot be accessed and is garbage.
Complexity: Difficult
Ahead: Basic Structuring Mechanisms
Subject: Chapter 1

42. Describe an important difference between how Java handles primitive variables, such as `int`, and non-primitive variables, such as `String`.
Ans: Primitive variables are handled “by value,” meaning that a variable of a primitive type holds the value of the variable. Non-primitive variables are handled “by reference,” meaning that a variable of a non-primitive type holds a reference to the value of the variable; i.e., it holds the address where you can find the value associated with the variable.
Complexity: Difficult
Ahead: Basic Structuring Mechanisms
Subject: Chapter 1

43. Write a section of code that declares a ten-element array of `Date` named `calendar` and then uses a loop to instantiate and initialize the elements, in order, to December 1 through 10 of 2015.
Ans:

```
Date[] calendar = new Date[10];
for (int i = 0; i < 10; i++)
   calendar[i] = new Date(12, i + 1, 2015) ;
```

Complexity: Difficult
Ahead: Basic Structuring Mechanisms
Subject: Chapter 1

44. For what purpose are constructor methods used?
Ans: To create new instances of the class – that is, to instantiate objects of the class.
Complexity: Moderate
Ahead: Classes, Objects, and Applications
Subject: Chapter 1
2. Describe some of the advantages of Java packages.
Ans: They let us organize our files. They can be compiled separately and imported into our programs. They make it easier for programs to use common class files. They help us avoid naming conflicts.
Complexity: Difficult

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Ahead: Organizing Classes
Subject: Chapter 1

45. What are the three major parts (actions that can be taken) of the Java exception mechanism?
Ans: Exceptions can be defined, raised or generated, and handled.
Complexity: Difficult
Ahead: Exceptional Situations
Subject: Chapter 1

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