**A+ Computer Science  
Sets M/C Test**

**Directions ::** On your answer sheet, mark the letter of the best answer to each question.

1. Which of the following Set methods will add a key to a Set?

|  |  |
| --- | --- |
| a. | add() |
| b. | remove() |
| c. | set() |
| d. | get() |
| e. | indexOf() |

2. Which of the following Map methods will add a <key,value> pair to a Map?

|  |  |
| --- | --- |
| a. | add() |
| b. | get() |
| c. | set() |
| d. | put() |
| e. | append() |

3. Which of the following HashSet instantiations would create a HashSet that could store Strings?

|  |  |
| --- | --- |
| a. | HashSet<Double> set = new HashSet<Double>(); |
| b. | HashSet<Integer> set = new HashSet<Integer>(); |
| c. | HashSet<String> set = new HashSet<String>(); |
| d. | HashSet<Boolean> set = new HashSet<Boolean>(); |
| e. | HashSet<Byte> set= new HashSet<Byte>(); |

4. Which of the following is an interface?

|  |  |
| --- | --- |
| a. | ArrayList |
| b. | HashSet |
| c. | TreeMap |
| d. | Collection |
| e. | LinkedList |

5. Which of the following is a child of Set?

|  |  |
| --- | --- |
| a. | ArrayList |
| b. | HashSet |
| c. | TreeMap |
| d. | Collection |
| e. | LinkedList |

6. What is output by the code below?

Set<Integer> s = new TreeSet<Integer>();

s.add( 675 );

System.out.println( s.add( 675 ) );

|  |  |
| --- | --- |
| a. | 0 |
| b. | 1 |
| c. | true |
| d. | false |
| e. | null |

7. What is the output of the code below?

Set<Integer> s = new TreeSet<Integer>();

s.add( 31 );

s.add( 65 );

s.add( -87 );

System.out.println( s );

|  |  |
| --- | --- |
| a. | [65, -87, 31] |
| b. | [31, 65, -87] |
| c. | [-87, 31, 65] |
| d. | [-87, 65, 31] |
| e. | [-87] |

8. What is output by the code below?

Set<Integer> s = new TreeSet<Integer>();

s.add( 31 );

s.add( 65 );

s.add( -87 );

System.out.println( s.size() );

|  |  |
| --- | --- |
| a. | 0 |
| b. | 1 |
| c. | 2 |
| d. | 3 |
| e. | 4 |

9. What is the output by the code below?

Collection c = new TreeSet<Integer>();

c.add(34);

c.add(34);

out.println(c.size());

|  |  |
| --- | --- |
| a. | 0 |
| b. | 1 |
| c. | 2 |
| d. | There is no output due to a syntax error. |
| e. | There is no output due to a runtime error. |

10. What is the output by the code below?

Set<String> s = new TreeSet<String>();

s.add("one");

s.add("two");

s.add("three");

out.println(s);

|  |  |
| --- | --- |
| a. | [one, three, two] |
| b. | [three, two, one] |
| c. | [one, two, three] |
| d. | [three] |
| e. | [two] |

11. What is the output?

Set<String> s = new TreeSet<String>();

s.add("89");

s.add("125");

s.add("32");

out.println(s);

|  |  |
| --- | --- |
| a. | [89, 125, 32] |
| b. | [125, 32, 89] |
| c. | [32, 89, 125] |
| d. | [125, 89, 32] |
| e. | There is no output due to a syntax error. |

12. What is the output by the code below?

Set<String> s = new TreeSet<String>();

s.add("one");

s.add("two");

s.add("one");

s.add("two");

out.println(s);

|  |  |
| --- | --- |
| a. | [one, two, one, two] |
| b. | [one, one, two, two] |
| c. | [one, two] |
| d. | [two, one] |
| e. | There is no output due to a syntax error. |

13. Which of the following would correctly fill /\* code \*/ ?

Set<String> words = new TreeSet<String>();

//add some stuff to words

for( /\* code \*/ )

{

out.println(s);

}

|  |  |
| --- | --- |
| a. | int s : words |
| b. | String s : words |
| c. | String s : words.get() |
| d. | String s : words.next() |
| e. | String s : Set |

14. Which of the following would correctly fill /\* code \*/ ?

Set<String> words = new TreeSet<String>();

//add some stuff to words

Iterator<String> it = words.iterator();

while( /\* code \*/ )

out.print( it.next() + " ");

|  |  |
| --- | --- |
| a. | it.Next() |
| b. | it.hasNextInt() |
| c. | it.getNext() |
| d. | it.iGotNextYo() |
| e. | it.hasNext() |

15. Which of the following best matches the runtime for HashSet?

add() contains()

Line 1. O(1) O(N)

Line 2. O(1) O(1)

Line 3. O(N) O(log2N)

Line 4. O(log2N) O(log2N)

Line 5. O(log2N) O(N)

|  |  |
| --- | --- |
| a. | Line 1 |
| b. | Line 2 |
| c. | Line 3 |
| d. | Line 4 |
| e. | Line 5 |

16. Which of the following would correctly fill /\* code \*/ ?

Set<Double> s = new TreeSet<Double>();

s.add( /\* code \*/ );

|  |  |
| --- | --- |
| a. | 45.44 |
| b. | new Double(23.22) |
| c. | 345 |
| d. | A and B only |
| e. | A, B, and C only |

17. Which of the following best matches the runtime for TreeSet?

add() contains()

Line 1. O(1) O(N)

Line 2. O(1) O(1)

Line 3. O(N) O(log2N)

Line 4. O(log2N) O(log2N)

Line 5. O(log2N) O(N)

|  |  |
| --- | --- |
| a. | Line 1 |
| b. | Line 2 |
| c. | Line 3 |
| d. | Line 4 |
| e. | Line 5 |

18. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 3, 5, 7, 9} |
| d. | {1, 2, 7, 9} |
| e. | {3, 5} |

19. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 3, 5, 7, 9} |
| d. | {1, 2, 7, 9} |
| e. | {3, 5} |

20. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 3, 5, 7, 9} |
| d. | {1, 2, 7, 9} |
| e. | {3, 5} |

21. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 3, 5, 7, 9} |
| d. | {1, 2, 7, 9} |
| e. | {3, 5} |

22. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}, C = {1, 2, 7, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 7, 9} |
| d. | {1, 7} |
| e. | (empty set) |

23. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}, C = {1, 2, 7, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 7, 9} |
| d. | {1, 7} |
| e. | (empty set) |

24. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}, C = {1, 2, 7, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 7, 9} |
| d. | {1, 7} |
| e. | (empty set) |

25. What is the resulting set?

*A = {1, 3, 5, 7}, B = {2, 3, 5, 9}, C = {1, 2, 7, 9}*



|  |  |
| --- | --- |
| a. | {1, 3, 5, 7} |
| b. | {2, 3, 5, 9} |
| c. | {1, 2, 7, 9} |
| d. | {1, 2, 3, 5, 7, 9} |
| e. | (empty set) |

26. What is a Set?

|  |  |
| --- | --- |
| a. | A list implemented with each element pointing to the next |
| b. | A resizeable array |
| c. | A collection that contains no duplicate elements |
| d. | A collection that maps keys to values |
| e. | A sorted array |

27. What does it mean when two sets are disjoint?

|  |  |
| --- | --- |
| a. | The two sets share no elements in common |
| b. | The two sets are random |
| c. | All the elements in one set are also in the other |
| d. | The two sets are not equal |
| e. | Both sets are not subsets of each other |

28. What is the cardinality of a set?

|  |  |
| --- | --- |
| a. | The number of subsets of a set |
| b. | The maximum element in a set |
| c. | The minimum element in a set |
| d. | The number of elements contained in a set |
| e. | The average of all the elements in a set |

29. What is the complement of a set?

|  |  |
| --- | --- |
| a. | A set that contains all elements not in the other set |
| b. | A set that contains only elements in the other set |
| c. | An equal set |
| d. | Elements that are in the set |
| e. | Elements that are not in the set |

30. What is a singleton?

|  |  |
| --- | --- |
| a. | A set that contains more than one element |
| b. | A set that contains only one element |
| c. | A single value in a set |
| d. | A single value not in a set |
| e. | A set operation that removes a single element |

31. Which of the following classes implement the interface Set?

|  |  |
| --- | --- |
| a. | HashSet |
| b. | TreeSet |
| c. | HashMap |
| d. | A and B only |
| e. | A, B, and C |

32. What is the difference between a HashSet and TreeSet?

|  |  |
| --- | --- |
| a. | TreeSet is based on natural ordering and HashSet makes no guarantee to the order |
| b. | TreeSet has no duplicates and HashSet does |
| c. | HashSet is a set of the hashes of the objects instead of the objects themselves |
| d. | HashSet has a slower run time assuming the hash function is constant time |
| e. | There is no difference |

33. What is the output by the code below?

Integer[] ar = {51, 42, 21, 13},

br = {17, 42, 13, 9, 100};

Set<Integer> as = new TreeSet<Integer>(Arrays.asList(ar)),

bs = new TreeSet<Integer>(Arrays.asList(br)),

cs = new TreeSet<Integer>(as);

cs.retainAll(bs);

out.println(cs);

|  |  |
| --- | --- |
| a. | [9, 13, 17, 42, 100] |
| b. | [51, 42, 21, 13] |
| c. | [42, 13] |
| d. | [13, 42] |
| e. | [13, 21, 42, 51] |

34. What is the output by the code below?

Integer[] ar = {51, 42, 21, 13},

br = {17, 42, 13, 9, 100};

Set<Integer> as = new TreeSet<Integer>(Arrays.asList(ar)),

bs = new TreeSet<Integer>(Arrays.asList(br)),

cs = new TreeSet<Integer>(as);

cs.addAll(bs);

out.println(cs);

|  |  |
| --- | --- |
| a. | [9, 13, 17, 42, 100] |
| b. | [9, 13, 17, 21, 42, 51, 100] |
| c. | [9, 13, 13, 17, 21, 42, 42, 51, 100] |
| d. | [21, 52] |
| e. | [13, 42] |

35. What is the output by the code below?

Integer[] ar = {51, 42, 21, 13},

br = {17, 42, 13, 9, 100};

Set<Integer> as = new TreeSet<Integer>(Arrays.asList(ar)),

bs = new TreeSet<Integer>(Arrays.asList(br)),

cs = new TreeSet<Integer>(as);

cs.removeAll(bs);

out.println(cs);

|  |  |
| --- | --- |
| a. | [9, 13, 17, 42, 100] |
| b. | [13, 21, 42, 51] |
| c. | [13, 42] |
| d. | [21, 52] |
| e. | [] |

36. What set operation does Set.addAll() implement?

|  |  |
| --- | --- |
| a. | union |
| b. | intersection |
| c. | set difference |
| d. | cartesian product |
| e. | set complement |

37. What set operation does Set.retainAll() implement?

|  |  |
| --- | --- |
| a. | union |
| b. | intersection |
| c. | set difference |
| d. | cartesian product |
| e. | set complement |

38. What set operation does Set.removeAll() implement?

|  |  |
| --- | --- |
| a. | union |
| b. | intersection |
| c. | set difference |
| d. | cartesian product |
| e. | set complement |

39. What laws do set operations obey?

|  |  |
| --- | --- |
| a. | Idempotency laws |
| b. | Commutative laws |
| c. | Absorption laws |
| d. | DeMorgan’s laws |
| e. | All of the above |

40. Set A is a subset of set B if?

|  |  |
| --- | --- |
| a. | The max value in set A is less than the max value in set B |
| b. | The sum of the elements in set A is less than the sum of the elements in set B |
| c. | All elements in set A are in set B |
| d. | Set A has a lesser cardinality than set B |
| e. | None of the elements in set A are in Set B |