student name [ ]

American University of Central Asia
Software Engineering Department

Programming I (COM 116), Structural Programming (COM-118)

Sample Final Examination

- You have one hour and fifteen minutes to finish the test.
- Circle one or multiple correct answers.
- In questions with multiple correct answers you have to select every single one to get a point.
- You can cross answers selected by a mistake.
- You can use the back of the sheets of paper to make notes or to trace code.
- Note that *public/private* and *static* modifiers in many code samples were removed to save space.
- All questions are from the official guide to the book, but the final questions will be written by us.

1. How should a correct entry point of a Java program look like?

    a) *public static void main(String[] args)*

    b) *public static void Main(string[] args)*

    c) *public void main(String[] args)*

    d) *public static int main(String[] args)*

2. Which of the following are valid Java comments?

    a) *// This will compile*

    b) */* This will compile */*

    c) */* /* This will compile */ */*

    d) */** This /// will compile */*

3. According to Java naming convention, which of the following names can be variables?

    a) *AbstractFactoryObserver*

    b) *Converter*

    c) *depth*

    d) *PI*

    e) *MAX_SCALE*

4. Which of the following is a constant, according to Java naming conventions?

    a) *MaxTemperature*

    b) *Pi*

    c) *TORQUE*

5. The expression 2 + 6 * 12 / (5 - 4 * (7 - 3)) is evaluated to

    a) *18*

    b) *18.5*

    c) *-4*

    d) *-4.(54)*

6. How many times is the *println* statement executed?

```
for (int i = 0; i < 5; i++) {
    for (int j = 0; j < i; j++) {
        System.out.println(i * j);
    }
}
```

    a) *5*

    b) *10*

    c) *15*

    d) *25*

7. Suppose your method does not return any value, which of the following keywords can be used as a return type?

    a) *void*

    b) *null*

    c) *int*

    d) *double*

8. Arguments to methods always appear within [ ].

    a) brackets

    b) quotation marks

    c) parentheses

    d) curly braces

9. Each time a method is invoked, the system stores parameters and local variables in an area of memory, known as [ ], which stores elements in last-in first-out fashion.

    a) a heap

    b) a stack

    c) a single-dimensional array

    d) a multidimensional array

10. Does the method call in the following method cause compile errors?

```
public static void pow(int a, int b) {
  Math.pow(a, b);
}
```

    a) Yes

    b) No, and the method is useful

    c) No, but the method is pointless

11. You should fill in the blank in the following code with [ ].

```
void main(String[] args) {
  System.out.print(
    "The grade is " +
      getGrade(92.5)
  );
  System.out.print(
    "\nThe grade is " +
      getGrade(56.2)
  );
}

[          ] getGrade(double score) {
  if (score >= 90.0) {
    return 'A';
  } else if (score >= 80.0) {
    return 'B';
  } else if (score >= 70.0) {
    return 'C';
  } else if (score >= 60.0) {
    return 'D';
  } else {
    return 'F';
  }
}
```

    a) *void*

    b) *boolean*

    c) *char*

    d) *int*

    e) *double*

12. Which of the following should be defined as a *void* method?

    a) Write a method that checks whether some value is an integer from *1* to *100.*

    b) Write a method that prints integers from *1* to *100.*

    c) Write a method that returns a random integer from *1* to *100.*

    d) Write a method that converts an uppercase letter to lowercase.

13. When you invoke a method with a parameter, the value of the argument is passed to the parameter. This is referred to as [ ].

    a) pass by value

    b) pass by reference

    c) pass by name

    d) method invocation

14. A variable defined inside a method is referred to as [ ].

    a) a local variable

   b) a global variable

15. Given the following method

```
void print(String m, int n) {
  while (n > 0) {
    System.out.print(m);
    n--;
  }
}
```

What is *k* after invoking the method?

```
int k = 2;
print("hi ", k);
```

   a) *4*
   b) *3*
   c) *2*
   d) *1*

16. Analyze the following code

```
void main(String[] args) {
  System.out.println(max(1, 2));
}

double max(int a, double b) {
  System.out.println(
    "max(int, double) is invoked"
  );

  if (a > b) {
    return a;
  } else {
    return b;
  }
}

double max(double a, int b) {
  System.out.println(
    "max(double, int) is invoked"
  );

  if (a > b) {
    return a;
  } else {
    return b;
  }
}
```

   a) The program cannot compile because the compiler cannot determine which *max* method should be invoked.
   b) The program runs and prints *2* followed by *"max(int, double)"* is invoked.
   c) The program cannot compile because you cannot have the *print* statement in a *non-void* method.
   d) The program runs and prints *"max(int, double) is invoked"* followed by *2*.
   e) The program runs and prints *2* followed by *"max(double, int)"* is invoked.

17. Analyze the following code

```
void main(String[] args) {
  System.out.println(m(2));
}

int m(int a) {
  return a;
}

void m(int b) {
  System.out.println(b);
}
```

   a) The program has a compile error because the second *m* method is defined, but not invoked in the main method.
   b) The program has a compile error because the two methods *m* have the same signature.
   c) The program runs and prints *2* once.
   d) The program runs and prints *2* twice.

18. What is the representation of the third element in an array called *a*?

   a) *a[2]*
   b) *a[3]*
   c) *a[4]*
   d) *a(2)*
   e) *a(3)*
   f) *a(4)*

19. If you declare an array *double[] list = { 4.2, 3.5, 2.1, 8.32 };*, *list[2]* is [ ].

   a) *4.2*
   b) *3.5*
   c) *2.1*
   d) *8.32*

20. Which of the following are incorrect?

   a) *int[] a = new int(5);*
   b) *int a() = new int[5];*
   c) *int[] a = new int[5];*
   d) *int a[] = new int[5];*

21. If you declare an array *double[] list = { 5.4, 7.2, 8.54, 2.36, 3.43 };*, the highest index in the array is [ ]?

   a) *5*
   b) *4*
   c) *3*
   d) *2*
   e) *1*
   f) *0*

22. How many elements are in the array *double[] list = new double[7];*?

   a) *8*
   b) *7*
   c) *6*
   d) *1*
   e) *0*

23. Analyze the following code.

```
int[] x = new int[3];
System.out.println("x[0] is " + x[0]);
```

   a) The program has a compile error because the size of the array wasn't specified when declaring the array.
   b) The program has a runtime error because the array elements are not initialized.
   c) The program has a runtime error because the array element *x[0]* is not defined.
   d) The program runs fine and displays *x[0]* is *0*.

24. Which of the following statements are valid?

   a) *int a = new int(30);*
   b) *double b[] = new double[30];*
   c) *char[] c = new char();*
   d) *int[] d = { 3, 4, 3, 2 };*
   e) *char[] e = new char[4] { ’a’, ’b’, ’c’, ’d’ };*

25. Assume *int[] d = { 0, 1, 2, 3, 4, 5, 6 }*. What is *d.length*?

   a) *8*
   b) *7*
   c) *6*
   d) *1*
   e) *0*

26. What is the output of the following code?

```
double[] numbers = {
  1, 5, 5, 5, 5, 1
};

double max = numbers[0];
int indexOfMax = 0;

for (
    int i = 1;
    i < numbers.length;
    i++
  ) {
  if (numbers[i] > max) {
    max = numbers[i];
    indexOfMax = i;
  }
}

System.out.println(indexOfMax);
```

   a) *4*
   b) *3*
   c) *2*
   d) *1*
   e) *0*

27. Analyze the following code

```
int[] x = new int[5];

int i;
for (i = 0; i < x.length; i++) {
  x[i] = i;
}

System.out.println(x[i]);
```

   a) The program has a runtime error because the last statement in the main method causes *ArrayIndexOutOfBoundsException.*
   b) The program has a compile error because *i* is not defined in the last statement.
   c) The program displays *4*
   d) The program displays *0 1 2 3 4*.

28. Analyze the following code

```
double[] values = { 1.2, 3.5, 4.23 };

for (double value : values) {
  System.out.print(value + " ");
}
```

   a) The program displays *1.2 3.5 4.23*
   b) The program displays *1 3 4*
   c) The program displays *1.2, 3.5, 4.23*
   d) The program has a syntax error because *value* is undefined.

29. What is the output of the following code?

```
int[] list = { 1, 2, 3, 4, 5, 6 };

for (
    int i = list.length - 2;
    i >= 0;
    i--
  ) {
  list[i + 1] = list[i];
}

for (int e: list) {
  System.out.print(e + " ");
}
```

   a) *1 2 3 4 5 6*
   b) *6 2 3 4 5 1*
   c) *6 1 2 3 4 5*
   d) *2 3 4 5 6 1*
   e) *1 1 2 3 4 5*

30. What is the output of the following code

```
int[] x = { 14, 15, 016 };
for (int i = 0; i < x.length; i++) {
  System.out.print(x[i] + " ");
}
```

a) *14 15 14*

b) *14 15 16*

c) *14 15 20*

d) *016* is a compile error. It should be written as *16*.

31. What is the output of the following code?

```
int list[] = { 1, 2, 3, 4, 5, 6 };

for (int i = 1; i < list.length; i++) {
  list[i] = list[i - 1];
}

for (int i = 0; i < list.length; i++) {
  System.out.print(list[i] + " ");
}
```

a) *1 1 1 1 1 1*

b) *1 2 3 4 5 6*

c) *2 3 4 5 6 6*

d) *2 3 4 5 6 1*

32. When you pass an array to a method, the method actually receives [ ].

a) a copy of the array

b) a copy of the first element

c) the length of the array

d) the reference of the array

33. When you return an array from a method, the method actually returns [ ].

a) a copy of the array

b) a copy of the first element

c) the length of the array

d) the reference of the array

34. What will be displayed by the following code?

```
void main(String[] args) {
  int[] list = { 1, 2, 3, 4, 5 };

  reverse(list);

  for (
      int i = 0;
      i < list.length;
      i++
    ) {
    System.out.print(
      list[i] + " "
    );
  }
}

void reverse(int[] list) {
  int[] newList =
    new int[list.length];

  for (
      int i = 0;
      i < list.length;
      i++
    ) {
    newList[i] =
      list[list.length - 1 - i];
  }

  list = newList;
}
```

a) The program displays *5 4 3 2 1.*

b) The program displays *5 4 3 2 1* and then raises an *ArrayIndexOutOfBoundsException.*

c) The program displays *1 2 3 4 5.*

d) The program displays *1 2 3 4 5* and then raises an *ArrayIndexOutOfBoundsException.*

35. The JVM stores the array in an area of memory, called [ ], which is used for dynamic memory allocation where blocks of memory are allocated and freed in an arbitrary order.

a) registers

b) stack

c) heap

d) cache

36. What will be displayed by the following code?

```
int[] list1 = { 1, 2, 3 };
int[] list2 = { 1, 2, 3 };

list2 = list1;
list1[0] = 0;
list1[1] = 1;
list2[2] = 2;

for (
    int i = 0;
    i < list1.length;
    i++
  ) {
  System.out.print(
    list1[i] + " "
  );
}
```

a) *0 1 2*

b) *0 1 3*

c) *1 2 3*

d) *1 1 1*

37. Analyze the following code

```
int[] a = new int[4];

a[1] = 1;
a = new int[2];

System.out.println(
  "a[1] is " + a[1]
);
```

a) The program displays *a[1]* is *1.*

b) The program displays *a[1]* is *0.*

c) The program has a compile error because *new int[2]* is assigned to *a.*

d) The program has a runtime error because *a[1]* is not initialized.

38. Suppose a method *p* has the following heading: *public static int[] p()*. What return statement may be used in *p()*?

a) *return int[] { 1, 2, 3 };*

b) *return new int[] { 1, 2, 3 };*

c) *return { 1, 2, 3 };*

d) *return 0;*

39. Which of the following statements is correct?

a) *char[][] characters = { ’a’, ’b’ };*

b) *char[2][2] characters = { { ’a’, ’b’ }, { ’c’, ’d’ } };*

c) *char[2][] characters = { { ’a’, ’b’ }, { ’c’, ’d’ } };*

d) *char[][] characters = { { ’a’, ’b’ }, { ’c’, ’d’ } };*

40. Assume *double[][] x = new double[4][5]*, what are *x.length* and *x[2].length*?

a) *5* and *4*

b) *5* and *5*

c) *4* and *4*

d) *4* and *5*

41. What is the indexed variable for the element at the first row and first column in some array *a*?

a) *a[0][1]*

b) *a[1][0]*

c) *a[0][0]*

d) *a[1][1]*

42. When you create an array using the following statement, the element values are automatically initialized to *0.*

```
int[][] matrix = new int[5][5];
```

a) True

b) False

43. How many elements are there in array *matrix*?

```
int[][] matrix = new int[5][5]
```

a) *16*

b) *25*

c) *30*

d) *36*

44. Analyze the following code

```
boolean[][] x = new boolean[3][];
x[0] = new boolean[1];
x[1] = new boolean[2];
x[2] = new boolean[3];

System.out.println(
  "x[2][2] is " + x[2][2]
);
```

a) The program has a compile error because *new boolean[3][]* is wrong.

b) The program has a runtime error because *x[2][2]* is *null.*

c) The program runs and displays *x[2][2]* is *null.*

d) The program runs and displays *x[2][2]* is *false.*

e) The program runs and displays *x[2][2]* is *true.*

45. What will be displayed by the following program?

```
int[][] values = {
  { 1, 7, 9, 15 },
  { 3, 5, 11, 13 }
};

int m = values[0][0];
for (
    int i = 0;
    i < values.length;
    i++
  ) {
  for (
      int j = 0;
      j < values[i].length;
      j++
    ) {
    if (m < values[i][j]) {
      m = values[i][j];
    }
  }
}

System.out.print(m);
```

a) *15*

b) *3*

c) *13*

d) *1*

46. What will be displayed by the following program?

```
int[][] values = {
  { 1, 7, 9, 15 },
  { 3, 5, 11, 13 }
};

int m = values[0][0];
for (int[] list : values) {
  for (int element : list) {
    if (m > element) {
      m = element;
    }
  }
}

System.out.print(m);
```

a) *15*

b) *3*

c) *13*

d) *1*