Final Exam

Programming Fundamentals (CS-130-02)

Fall 2022 **Total=100 points (3hr)**

Name:

Question 1 to 28 multiple choices, highlight with green color also type the answer. (30 points)
Question 29-32 descriptive answers with examples (4*5 points)
Question 33-39 programming (50 points)

1. Random generator = new Random();

   int randNum = generator.nextInt(10) + 4;

   Which of the following will be true after these lines are executed?

   A. randNum will hold a number between 4 and 10 inclusive.
   B. randNum will hold a number between 4 and 14 inclusive.
   C. randNum will hold a number between 4 and 13 inclusive.
   D. these lines will not be executed because a compiler error will result.
   E. none of the above

   Answer: C

2. **Suppose we want to write an if statement to test whether two String objects, referenced by stringOne and stringTwo, are the same. Which of the following is the correct way to achieve this?**
   A. if(stringOne == stringTwo)
   B. if(stringOne.equals(stringTwo))
   C. if(stringOne != stringTwo)
   D. if(stringOne === stringTwo)

   Answer: B

3. **Which of the following best describes this code snippet?**
   if (count != 400)
   System.out.println("Hello World!");
   A. If the variable count is not equal to 400, "Hello World" will be printed.
   B. If the variable count is close to, but not greater than, 400, "Hello World" will be printed.
   C. If the variable count is exactly equal to 399 or 401, "Hello World" will be printed.
   D. If the variable count is exactly equal to 400, "Hello World" will be printed.
   E. This code will not be compiled.

   Answer: A

4. **Let a and b be valid boolean expressions. Which of the following best describes the result of the expression a || b?**
   A. It will evaluate to true if a evaluates to true and b evaluates to true. It will evaluate to false otherwise.
   B. It will evaluate to false if a evaluates to false and b evaluates to false. It will evaluate to true otherwise.
   C. It will evaluate to true if a evaluates to false and b evaluates to false. It will evaluate to true otherwise.
   D. It will evaluate to true if a evaluates to false or b evaluates to false. It will evaluate to true otherwise.

   Answer: D

5. **Which of the following expressions best represents the condition "if the grade is between 85 and 90"?**
   A. if (85 < grade || grade < 90)
   B. if (85 > grade || grade < 90)
   C. if (85 < grade < 90)
   D. if (85 < grade && grade < 90)

   Answer: D

6. **What is a java keyword used in switch statements that causes immediate exit or that terminates the switch statement?**
   A. The case keyword.
   B. The switch keyword.
   C. The default keyword.
   D. The break keyword

   Answer: D

7. **Which of the following expressions correctly computes the value of the mathematical expression 5 + 2^7?**
   A. result = 5 + 2*Math.exponent(7);
   B. result = 5 + Math.pow(2, 7);
   C. result = 5 + 2*exponent(7);
   D. result = 5 + 2^7;

   Answer: B

8. **In Java, array indexes always begin at _____ .**
   A. 2
   B. 0
   C. 1
   D. -1

   Answer: B

9. String word = "Keep Trying";
What is **word.length()?**

A. 11
B. 10
C. 12
D. 13

Answer: A

10. String word = "Keep Trying";
What is **word.substring(3,6)?**

A. p Try
B. ep Tr
C. p T
D. p Tr

Answer: C

11. What package contains the Math class?

A. Java.io
B. Java.util
C. Java.lang
D. Java.text

Answer: B

12. What is the output?

```
do {
System.out.println("ExamDay");
}while (true);
```

A. ExamDay ExamDay ExamDay
B. ExamDay
C. compile error
D. infinite loop ExamDay

Answer: D

13. What would be output by the following program segment?

```
String n1 = "Monday";
String n2 = "Tuesday";
System.out.print(n1.compareTo(n2));
```

A. 7
B. -7
C. 8
D. -8

Answer: B

14. What package contains the Random class?

A. Java.io
B. Java.util
C. Java.lang
D. Java.text

Answer: B

15. what is the output?

```
do {
System.out.println("Thursday");
}while (false);
```

A. Thursday Thursday Thursday
B. Thursday
C. compile error
D. infinite loop Thursday

Answer: B

16. Which of the following lines is a properly formatted comment in Java?

A. // This is a comment
B. /* This is a comment */
C. #This is a comment
D. Both a and b

Answer: D

17. A cast is indicated with the following syntax in Java.

A. result = [int] total / count;
B. result = (int) total / count;
C. result = “int” total / count;
D. result = {int} total / count;

Answer: B

18. For a program to run on a computer, it must be expressed in _____.

A. an assembly language
B. a machine language
C. a high-level language
D. an object-oriented language

Answer: B

19. Which of the following data conversions could result in data loss?

A. long to float
B. short to long
C. double to float
D. int to long

Answer: C

20. Which of the following is a correct declaration of enumerated type for the suits of a deck of cards?

A. enumerated type Suit = { hearts, spades, diamonds, clubs };
B. enum Suit {hearts, spades, diamonds, clubs;}
C. enumerated type Suit = (hearts, spades, diamonds, clubs);
D. enum Suit (hearts, spades, diamonds, clubs);

Answer: B

21. What is a part of a switch statement that will execute if there are no values that matched the given choices?

A. case
B. break
C. default
D. None of the above

Answer: C

22. How do you write Conditional AND operators in Java?

A. &
B. and
C. &&
D. ||

Answer: C

23. Decide if the Boolean expression evaluates to true or false. Given:

a = 1, b = 1, c = 3

a != b

A. true
B. false

Answer: B

24. You can have other if-else inside another if-else block

A. if-else statement
B. else-if statement
C. nested if-else blocks
D. if-statement

Answer: C

25. For the array:

int stats[4];

What is the range of the index?

A. 0 to 4
B. 0 to 3
C. 1 to 4
D. 1 to 3

Answer: B

26. double [] average = new double [10];

average[10] = 15.25;

A. A cast is required
B. data not initialized
C. A two-dimensional array is required
D. Array Out-of-bounds error

Answer: D

27. An array uses _____ indexing to keep track of each memory allocation unit in the array.

A. one-based
B. zero-based
C. 10-based
D. 100-based

Answer: B

28. int [ ] numbers= { 1, 2, 5, 10, 15, 20, 25, 35, 45};

If it does not have a definite answer, write down the reason.

A. What is the value of numbers.length? ____**9**_____

B. What is the value of numbers [4]? _____**15**_____

C. **What is the value of numbers [6]?** _____25_____

…….

29. In your words explain what a Looping structure with suitable example.

A looping structure is a change in sequence where until a specified condition is met with a newly created local variable, the contents of the loop will be repeated. Types of looping structures include for loops, while loops, and do-while loops.

```
for (int i = 0; i < 10; i++) {
        System.out.println(i);
}
```

Result:

0

1

2

3

4

5

6

7

8

9

10

30. **In your own words, explain how the break and continue statement is used in control structure.**

Break and continue statements can change the sequence of execution in a switch statement when read. The break statement will prevent the contents from all following statements being printed after the original case, and the continue statement will skip the next case.

```
int i = 2;
switch(i) {
        case 1:
        i++;
        break;

        case 2:
        i--;
        //the continue will proceed to case 4
        //i is now equal to 1
        continue;
```

```
        case 3:
        i--
        break;

        case 4:
        i++;
        //break will end the sequence before going to case 5
        //i is now equal to 2
        break;

        case 5:
        i = 0;
}
```

In your own words, explain the difference between public and private access modifiers.

Public will allow an element to be accessible anywhere, whereas private will only be accessible within its package. If you want to use a private element in another class in the same package, you will need to create getter and setter methods in the original class.

```
public class c1 {

private int element1 = 5;
public int element2 = 8;

//getter
private int getElement(int element1) {
        this.element1 = element1;
}

//setter
```

```
private int setElement(int newElement1) {
        this.element1 = newElement1;
}

}



public class c2 {
//main
Public static void main(String[] args) {
//creating an object for the main
c2 object = new c2();

//print the public variable freely
System.out.println(element2);

//call the getter in order to gain access to the private variable
//print element1
System.out.println(object.getElement1());

//change the value of element1 with the setter
object.setElement1(9);

//print the new value for element1
System.out.println(object.getElement1());
}
}
```

31. Explain the methods of an array list using suitable examples : addAll, contains

An array list has various different methods exclusive to it that can be used. Two notable new methods would include addAll and contains. The addAll method will add all of the elements from another array list to the current one, and the contains method will check to see if a specified element exists within the array list.

```
import java.util.ArrayList;

ArrayList <Integer> list1 = new ArrayList <Integer>();

list1.add(1);
list1.add(4);
list1.add(9);



ArrayList <Integer> list2 = new ArrayList <Integer>();

list2.add(5);
```

```
list2.add(13);



//add all elements from list2 to list1
list1.addAll(list2);

//contains will check to see if the specified element (8) can be found within list2. It will print false.
if (list2.contains(8)) {
System.out.println("True");
} else {
System.out.println("False");
}
```

……

Programming Questions: Use Eclipse to work on the following questions. Create the class name as Question33, Question 34…**Take a snippet of the code and the output and paste it after each question**. Upload your code on a GitHub new repository called **Exam22** and add the link along with this document (**Convert it to PDF**) on Moodle.

32. Write a <u>while</u> loop that prints "I love ExamDay!" 10 times. 6 points

```
1  package Finals;
2
3  public class Question32 {
4  static int count = 0;
5      public static void main(String[] args) {
6          // TODO Auto-generated method stub
7          while(count < 10) {
8              System.out.println("I love ExamDay!");
9              count++;
10         }
11     }
12
13 }
14
```

```
I love ExamDay!
I love ExamDay!
I love ExamDay!
I love ExamDay!
I love ExamDay!
I love ExamDay!
I love ExamDay!
I love ExamDay!
I love ExamDay!
I love ExamDay!
```

33. Write an application that will prompt the user for a double-floating point number and that prints the **square of that number**. Sample output would be:
Write down formatted output about two decimal places using **Decimal Format.**
Enter a double-floating point number: 5.23
The result is : 2.2869
The formatted result is :2.29 **6 points**

```java
package Finals;
import java.util.Scanner;
import java.text.NumberFormat;

public class Question33 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner scan = new Scanner(System.in);

        System.out.println("Enter a floating point double value: ");
        double value = scan.nextDouble();

        double result = Math.sqrt(value);
        System.out.println("The result of " + value + " when squared is: "
                + result);

        System.out.println("The formatted result is: " + Math.ceil(result));
    }

}
```

```
Enter a floating point double v
5.23
The result of 5.23 when squared
The formatted result is: 3.0
```

```
alue:

 is: 2.2869193252058544
```

34. In the United States as of 1995, minor is generally legally defined as a person under the age of 18. Write a code to check if a student is **a minor or not**. Verify the code by two user input**. 6 points**

```java
package Finals;
import java.util.Scanner;

public class Question34 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner scan = new Scanner(System.in);

        System.out.println("Enter your age: ");
        double age = scan.nextInt();

        if (age >= 18) {
            System.out.println("You are not a minor");
        } else {
            System.out.println("You are a minor");
        }
    }

}
```

```
Enter your age:
16
You are a minor
```

```
Enter your age:
19
You are not a minor
```

35. **Write a program that prompts the user for a workday number. Then, based on the number it classifies the working days (M-F) of a week.** The week starts on Monday. **If the day number doesn't start with any of those case numbers, then you print "Holiday".** Below is a list of the classifications and sample run: Use Switch Case statements.

    1 - Monday
    2 – Tuesday

    …
    Anything else - Holiday **6 points**

```java
package Finals;
import java.util.Scanner;

public class Question35 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner scan = new Scanner(System.in);

        System.out.println("Enter the value of the day you'd like to work\n"
                + "For example, if you want to work Friday, enter 5");

        int choice = scan.nextInt();

        switch (choice) {
        case 1:
            System.out.println("Monday");
            break;

        case 2:
            System.out.println("Tuesday");
            break;

        case 3:
            System.out.println("Wednesday");
            break;

        case 4:
            System.out.println("Thursday");
            break;

        case 5:
            System.out.println("Friday");
            break;

        default:
            System.out.println("Holiday");
```

```
                System.out.println("Holiday");
                break;
            }
        }

}
```

```
Enter the value of the day you'
For example, if you want to wor
1
Monday
```

36. Get an input from user and check whether the number is **odd and greater than 10**. If not, then print relevant comments. **6 points**

```
package Finals;
import java.util.Scanner;

public class Question36 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Scanner scan = new Scanner(System.in);

        System.out.println("Enter a number: ");
        int input = scan.nextInt();

        if (input % 2 != 0 && input > 10) {
            System.out.println(input + " is odd and greater than 10");
        } else if (input % 2 != 0 && input < 10) {
            System.out.println(input + " is odd but less than 10");
        } else if (input % 2 == 0 && input > 10) {
            System.out.println(input + " is greater than 10 but equal");
        } else if (input % 2 == 0 && input < 10) {
            System.out.println(input + " is equal and less than 10");
        } else {
            System.out.println("input is 10");
        }
    }

}
```

```
Enter a number:
81
81 is odd and greater than 10
```

37. Create a **Integer Array List and add 10 random numbers** into it.

a. Use **random number generator** to generate those random numbers of a **range of 30.**

b. Print **each of the array list element along with its index using loop structure**. **5+5 points**

```java
package Finals;
import java.util.Random;
import java.util.ArrayList;

public class Question37 {

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Random generator = new Random();
        ArrayList <Integer> list1 = new ArrayList <Integer>();

        for (int i = 0; i < 10; i++) {
        list1.add(generator.nextInt(0, 30));
        }

        for (int i = 0; i < 10; i++) {
            System.out.println(i + ") " + list1.get(i));
        }
    }

}
```

```
0) 9
1) 23
2) 5
3) 13
4) 24
5) 14
6) 9
7) 10
8) 4
9) 15
```

38. Write a program to print the area and perimeter of a rectangle by creating a class named 'Rectangle'. Use a single class for this code.

a. Create a class called Rectangle.
b. Pass two private parameters height, width
c. Create methods called areaRec(), and periRec()
d. Find the area and perimeter for height 10, width 20 **5+5 points**

Class	Attribute	Method
Rectangle	-height: int -width: int	+areaRec():double +periRec():double

```java
package Finals;

public class Rectangle {
private int height;
private int width;

//methods
public int areaRec(int height, int width) {
    return height * width;
}

public int periRec(int height, int width) {
    return 2 * (height + width);
}

    public static void main(String[] args) {
        // TODO Auto-generated method stub
        Rectangle object = new Rectangle();

        System.out.println("Area: ");
        System.out.println(object.areaRec(10, 20));

        System.out.println("\nPerimeter: ");
        System.out.println(object.periRec(10, 20));
    }

}
```

```
Area:
200

Perimeter:
60
```