ECE 30862 Fall 2016, First Exam

DO NOT START WORKING ON THIS UNTIL TOLD TO DO SO. LEAVE IT ON THE DESK.

THE LAST PAGE IS THE ANSWER SHEET. TEAR IT OFF AND PUT ALL ANSWERS THERE. TURN IN BOTH PARTS OF THE TEST WHEN FINISHED.

You have until 9:00PM to take this exam. The total number of points should be 100. After taking the test, turn in both the test and the answer sheet.

Your exam should have this sheet, 8 pages with 40 questions, and the answer sheet. As soon as the test begins, check that your exam is complete and *let Prof. Midkiff know immediately if it does not.*

This exam is open book, open notes, but absolutely no electronics. If you have a question, please ask for clarification. If the question is not resolved, state on the test whatever assumptions you need to make to answer the question, and answer it under those assumptions. *Check the front board occasionally for corrections.*

Every question is worth 2.5 points.

I have neither given nor received help during this exam from any other person or electronic source, and I understand that if I have I will be guilty of cheating and will fail the exam and perhaps the course.

Name (must be signed to be graded):

Name (printed, worth 1 pt):

Last four digits of your ID:

For each statement below which has a question number (e.g., **Q7**), write the output that results from executing the statement on the answer sheet. If the line would produce an error at either compile or run time put ``E" on the answer sheet. For a compile time warning, put "W"

```
public class B {

  public B( ) {
    System.out.println("B");
  }
  public void f1( ) {
    System.out.println("B");
  }
  private void f1(int i) {
    System.out.println("B(i)");
  }
  public void f2( ) {
    System.out.println("B ");
    f1(0);
  }
  public void f3( ) {
    System.out.println("B");
  }
}

public class DX extends B {

  public DX( ) {
    System.out.println("DX");
  }
  public void f1( ) {
    System.out.println("DX");
  }
}

public class D1 extends B {

  public D1( ) {
    System.out.println("D1");
  }
  public void f1(int i) {
    System.out.println("D1(i)");
  }
  public void f2( ) {
    System.out.println("D1");
    f1(0);
  }
}

  public void f4( ) {
    System.out.println("D1");
  }
}
```

```
public class D2 extends D1 {

  public D2( ) {
    super( );
    System.out.println("D2");
  }
  public void f3( ) {
    System.out.println("D2");
  }
}

class Main {

  public static void main(String args[]) {

    B b = new B( ); // Q1
    D1 d1 = new D1( ); // Q2
    D2 d2 = new D2( ); // Q3
    DX dx = new DX( );

    b.f1( ); // Q4
    b.f1(1); // Q5
    d1.f4( ); // Q6
    d2.f2( ); // Q7
    d2.f2( ); // Q8

    b = d2; // Q9 (answer "ok", "E" or "W")
    d1 = d2;

    b.f3( ); // Q10
    b.f1(1); // Q11
    b.f4( ); // Q12

    d1.f1( ); // Q13
    d1.f4( ); // Q14

    d1 = dx; // Q15 (answer "ok", "E" or "W")
    d2 = b; // Q16 (answer "ok", "E" or "W")
    d2 = (D2) b; // Q17 (answer "ok", "E" or "W")
  }
}
```

For each statement below which has a question number (e.g., **Q18**), write the output that results from executing the statement on the answer sheet. If the line would produce an error at either compile or run time put ``E'' on the answer sheet. For a compile time warning, put "W"

```
public class B {

  private int i=1;
  public int j=2;

  public void f(B b) {
    System.out.println(b.i);
    System.out.println(b.j);
  }
}
public class D extends B {

  public int i=10;

}
```

```
class Main {

  public static void main(String args[]) {

    B b = new B( );
    D d = new D( );

    System.out.println(b.i); // Q18

    System.out.println(d.i); // Q19
    System.out.println(d.j); // Q20
    b.f(d); // Q21

    b = d;
    System.out.println(b.j); // Q22
    b.f(d); // Q23
  }
}
```

For each statement below which has a question number (e.g., **Q24**), write the output that results from executing the statement on the answer sheet. If the line would produce an error at either compile or run time put ``E'' on the answer sheet. For a compile time warning, put "W"

```
public class B {

  private static void f1( ) {
    System.out.println("B");
  }

  public static void f2( ) {
    System.out.println("B");
  }

}

public class D extends B {

  public static void f1( ) {
    System.out.println("D");
  }

  public void f( ) {
    B.f2( );
    D.f2( );
  }
}
```

```
class Main {

  public static void main(String args[]) {

    D d = new D( );

    B.f1( ); // Q24

    D.f1( ); // Q25
    D.f2( ); // Q26

    D.f( ); // Q27
    d.f( ); // Q28
  }
}
```

Answer questions 29 through 32 below using the code on this page

```
public class E1 extends Exception {
  public E1( ) { }

  public String toString( ) {
    return "1";
  }
}
public class E2 extends Exception {
  public E2( ) { }

  public String toString( ) {
    return "2";
  }
}
```

```
public class Main {

  public static void thrower(int i) throws E1, E2 {
    if (i == 1) throw new E1( );
    if (i == 2) throw new E2( );
    System.out.println("0");
  }

  public static void main(String args[]) throws E1 {
    for (int i = 0; i < 3; i++) { // first for
      try {
        thrower(i);
      } catch (E1 e1) {System.out.println(e1);
      } catch (E2 e2) {System.out.println(e2);
      } finally {
        System.out.println(8);
      }
    }
    try {
      for (int j = 0; j < 3; j++) { // second for
        thrower(j);
       }
    } catch (E1 e1) {System.out.println(e1);
    } catch (E2 e2) {System.out.println(e2);
    } finally {
      System.out.println(9);
    }
  }
}
```

Q29: what is printed in iteration i=0 of the first for loop?
Q30: what is printed in iteration i=2 of the first for loop?
Q31: what is printed in iteration i=1 of the second (j) for loop?
Q32: what is printed in iteration i=2 of the second (j) for loop?

For each statement below which has a question number (e.g., **Q24**), write the output that results from executing the statement on the answer sheet. If the line would produce an error at either compile or run time put ``E'' on the answer sheet. For a compile time warning, put "W"

```
public class Dv1 implements Cloneable {

  public int[ ] a = {1, 2}; // a[0] is 0, a[1] = 1

  public String toString( ) {
    return ""+a[0]+", "+a[1];
  }

  public Object clone( ) throws
    CloneNotSupportedException {

    Dv1 newD = (Dv1) super.clone( );
    newD.a = new int[2];
    newD.a[0] = a[0];
    newD.a[1] = a[1];
    return newD;
  }
}
public class Dv2 implements Cloneable {

  public int[ ] a = {1, 2}; // a[0] is 0, a[1] = 1

  public String toString( ) {
    return ""+a[0]+", "+a[1];
  }

  public Object clone( ) throws
    java.lang.CloneNotSupportedException {
    return super.clone( );
  }
}
```

```
class Main {

  public static void main(String args[]) {

    Dv1 dv1 = new Dv1( );
    Dv1 cv1 = null;
    Dv2 dv2 = new Dv2( );;
    Dv2 cv2 = null;

    try {
      cv1 = (Dv1) dv1.clone( );
      cv2 = (Dv2) dv2.clone( );
    } catch (CloneNotSupportedException e) {
            System.out.println(e);
    }

    cv1.a[0] = 99;
    cv2.a[0] = 99;

    System.out.println(dv1.a[0]+", "+dv1.a[1]+",
                        "+cv1.a[0]+", "+cv1.a[1]); // Q33

    System.out.println(dv2.a[0]+", "+dv2.a[1]+",
                        "+cv2.a[0]+", "+cv2.a[1]); // Q34
  }
}
```

Answer the questions below using the code below.

```
public abstract class A1 {

  private void f1( ) {
    System.out.println("B");
  }

  public abstract void f2( );

}
```

```
public abstract class A2 {

  public abstract void f( );

}
public abstract class A3 {

  public abstract void f( );

}
```

Q35: If a class extends A1, what methods does it need to implement:
(a) f1, because it is private.
(b) f2, because it is abstract.
(c) A constructor for A1 since none is provided in the abstract class.
(d) All of (a), (b), (c)

Q36: Which is most correct about A2 and A3
(a) A class can extend both A2 and A3 because the abstract functions in both have the same name and arguments.
(b) A class can never extend more than one class, even if the classes are abstract.
(c) A class could implement, rather than extend one of A2 and A3, and extend the other.

Answer the questions below using the code below.

```
public interface I1 {

  public void f1( ) {
    System.out.println("B");
  }

  public abstract void f2( );

}
```

```
public interface I2 {

  public abstract void f( );

}
public interface I3 {

  public abstract void f( );

}
```

```
public interface I3 {

  public abstract void f( );

}
```

Q37: Pick the answer that is most true about interface I1:

(a) A class implementing I1 only needs to implement f2 because f1 is already implemented.

(b) It is illegal to have a method body for a method in an interface, so *public void f1( )* is illegal and will give a compile time error.

(c) Java will assume this is an abstract class,not not an interface, because f1 is implemented.

Q38: Pick the answer that is most true. If a class implements both interfaces I2 and I3, it must:

(a) give two implementations for *public abstract void f( )* since it appears in both interfaces

(b) It is illegal for a class to implement more than one interface.

(c) It is illegal to implement two or more interfaces that contain abstract functions with the same name and arguments.

(d) Only a single implementation of *public abstract void f( )* is needed to implement both interfaces.

For each statement below which has a question number (e.g., **Q39**), write the output that results from executing the statement on the answer sheet. If the line would produce an error at either compile or run time put ``E'' on the answer sheet. For a compile time warning, put "W"

```
class Main {

  private void foo(int i, float f) {
    System.out.println("foo if");
  }

  private void foo(short i, float f) {
    System.out.println("sf");
  }

  private void bar(byte b, double d) {
    System.out.println("bd");
  }

  private void bar(short s, float f) {
    System.out.println("sf");
  }

  public static void main(String args[]) {

    Main m = new Main( );
    short s = 1;
    byte b = (byte) 1;
    float f = (float) 1.0;

    m.foo(b, f); // Q39
    m.bar(b, f); // Q40

  }
}
```

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ECE 30862 Fall 2016 First Exam Answer Sheet

All answers should be on this sheet. Both this sheet and your test must be signed and turned in. You may detach this sheet from the rest of the test to make it easier to write your answers on it. Each question is worth 4 points.

I promise that I have neither Given nor received disallowed aid on this test.

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Name (Signed):

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