

COP 3804
Programming II

Examination 3

Name: _____

SAMPLE

This exam has 3 additional pages with 3 questions.

1. [35 pts] Consider the following code:

```
interface Fooable
{
    void foo( );
}

interface Barable
{
    void bar( );
}

class B implements Fooable
{
    public void foo( )
    { }
}

class C extends B implements Barable
{
    public void bar( )
    { }
}

class D
{
    public void foo( )
    { }

    public void bar( )
    { }
}
```

- (a) Draw the inheritance hierarchy for all the classes and interfaces shown above.
(b) which of the following lines of code are legal?

```
Fooable obj = new Fooable( );
Fooable obj = new B( );
Fooable obj = new C( );
Barable obj = new C( );
Barable obj = new D( );
```

- (c) Suppose class E IS-A Fooable, Barable, and a D. Write the minimal class declaration for E.

2. [30 pts] Answer each part TRUE or FALSE

- (a) An interface is an abstract class.
- (b) An interface can declare instance data.
- (c) Any method in an interface must be public.
- (d) All methods in an interface must be abstract.
- (e) An interface can have no methods at all.
- (f) An interface can extend another interface.
- (g) An interface can declare constructors.
- (h) A class may extend more than one class.
- (i) A class may implement more than one interface.
- (j) A class may extend one class and implement one interface.
- (k) An interface may implement some of its methods.
- (l) Methods in an interface may provide a `throws` list.
- (m) All methods in an interface must have a `void` return type.
- (n) `Throwable` is an interface.
- (o) `Object` is an abstract class.

3. [35 pts] Method `contains` takes an array of integers and returns true if there exists any item in the array that satisfies a specified condition.

For instance, in the following code fragment:

```
int [ ] input = { 100, 37, 49 };

boolean result1 = contains( input, new Prime( ) );
boolean result2 = contains( input, new PerfectSquare( ) );
boolean result3 = contains( input, new Negative( ) );
```

The intended result is that `result1` is `true` because 37 is a prime number, `result2` is `true` because both 100 and 49 are perfect squares, and `result3` is `false` because there are no negative numbers in the array.

Implement the following components:

- (a) An interface that will be used to specify the second parameter to `contains`.
- (b) The `contains` method (which is a static method).
- (c) The class `Negative`.