

# תוכנה 1

תרגול 14 - סיכום  
רובי בוים ומתי שמרת

# קצת על ממשקים

■ ממשק יכול להרחיב יותר מממשק אחד

■ שירותים בממשק הם תמיד מופשטים וציבוריים

```
public interface MyInterface {  
    public abstract int foo1(int i);  
    int foo2(int i);  
}
```

The “type” of foo1 and foo2 is the same.

# מנשקים

```
public interface Foo {  
    public void bar() throws Exception;  
}
```

```
public class FooImpl implements Foo {  
    public void bar() {  
        System.out.println("No exception is thrown");  
    }  
}
```

```
public static void main(String args[]) {  
    Foo foo = new FooImpl();  
    foo.bar();  
}
```

Compilation Error: "Unhandled exception type Exception"   ption?
If yes, why? If no, what is the output?

# מנשקים

```
public interface Foo {  
    public void bar() throws Exception;  
}
```

```
public class FooImpl implements Foo {  
    public void bar() {  
        System.out.println("No exception is thrown");  
    }  
}
```

```
public static void main(String args[]) {  
    FooImpl foo = new FooImpl();  
    foo.bar();  
}
```

Output:

No exception is thrown

If yes, why? If no, what is the output?

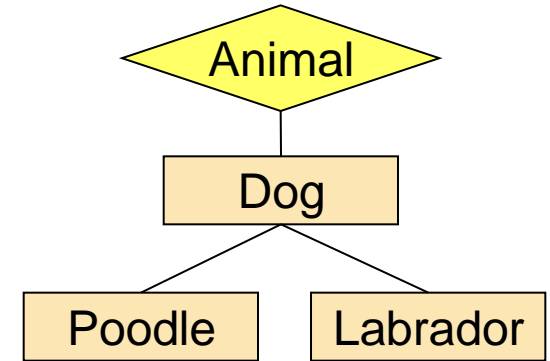
n?



# מנשקים וירושה

Consider the following class hierarchy:

```
Interface Animal {...}
class Dog implements Animal {...}
class Poodle extends Dog {...}
class Labrador extends Dog {...}
```



Which of the following lines (if any) will not compile?

```
Poodle poodle = new Poodle();
Animal animal = (Animal) poodle;
Dog dog = new Labrador();
animal = dog;
poodle = dog;
```

poodle = (Poodle) dog;  
-No compilation error  
-Runtime Exception

- Compilation Error  
Type mismatch: cannot convert

Labrador labrador = (Labrador) dog;  
-No compilation error  
-No Runtime Exception

# מנשקים וירחשה



```
class A {  
    public void print() {  
        System.out.println("A");  
    }  
}
```

```
class B extends A implements C {  
}
```

```
interface C {  
    void print();  
}
```

Is there an error? s

public by default

# מנשקים וירושה

```
class A {  
    void print() {  
        System.out.println("A");  
    }  
}
```

```
class B extends A implements C {  
}
```

```
interface C {  
    void print();  
}
```

Is there an error?

The inherited package method A.print() cannot hide the public abstract method in C

# Method Overloading & Overriding

```
public class A {  
    public float foo(float a, float b) throws IOException{  
    }  
}
```

```
public class B extends A {  
    ...  
}
```

Which of the following methods can be defined in B:

1. `float foo(float a, float b){...}`
2. `public int foo(int a, int b) throws Exception{...}`
3. `public float foo(float a, float b) throws Exception{...}`
4. `public float foo(float p, float q) {...}`

Answer: 2 and 4



# Method Overriding

```
public class A {  
    public void print() {  
        System.out.println("A");  
    }  
}
```

```
public class B extends A {  
    public void print(){  
        System.out.println("B");  
    }  
}
```

```
public class C {  
    public static void main(String args[]) {  
        B b = new B();  
        A a = b;  
        b.print();  
        a.print();  
    }  
}
```

Casting is  
unnneeded

The output is: B  
B  
Does it compile? If no, why?  
Does it throw a runtime exception?  
If so, what is the output?

# Method Overriding & Visibility

```
public class A {  
    public void print() {  
        System.out.println("A");  
    }  
}
```

```
public class B extends A {  
    protected void print() {  
        System.out.println("B");  
    }  
}
```

```
public class C {  
    public static void main(String[] args) {  
        B b = new B();  
        b.print();  
    }  
}
```

Compilation error:  
"Cannot reduce the visibility  
of the inherited method"

no, why?  
time exception?  
he output?

# Method Overriding & Visibility

```
public class A {  
    protected void print() {  
        System.out.println("A");  
    }  
}
```

```
public class B extends A {  
    public void print() {  
        System.out.println("B");  
    }  
}
```

```
public class C {  
    public static void main(String[] args) {  
        B b = new B();  
        b.print();  
    }  
}
```

The output is:

B

?

# Inheritance

```
public class A {  
    public void foo() {  
        System.out.println("A.foo()");  
    }  
  
    public void bar() {  
        System.out.println("A.bar()");  
        foo();  
    }  
}
```

```
public class B extends A {  
    public void foo() {  
        System.out.println("B.foo()");  
    }  
  
    public static void main(String[] args) {  
        A a = new B();  
        a.bar();  
    }  
}
```

The output is:

A.bar()

B.foo()

file? If no, why?

a runtime exception?

what is the output?

# Inheritance

```
public class A {  
    private void foo() {  
        System.out.println("A.foo()");  
    }  
  
    public void bar() {  
        System.out.println("A.bar()");  
        foo();  
    }  
}
```

```
public class B extends A {  
    public void foo() {  
        System.out.println("B.foo()");  
    }  
  
    public static void main(String[] args) {  
        A a = new B();  
        a.bar();  
    }  
}
```

Does the code compile? If no, why?  
Does the code throw a runtime exception?  
If yes, why? If no, what is the output?

# Inheritance

```
public class A {  
    public void foo() {...}  
}
```

```
public class B extends A {  
    public void foo() {...}  
}
```

How can you invoke the `foo` method of `A` within `B`?

Answer:

Use `super.foo()`

# Inheritance

```
public class A {  
    public void foo() {...}  
}
```

```
public class B extends A {  
    public void foo() {...}  
}
```

```
public class C extends B {  
    public void foo() {...}  
}
```

How can you invoke the `foo` method of `A` within `C`?

Answer:

Not possible

(`super.super.foo()` is illegal)

# Inheritance & Constructors

```
public class A {  
    String bar = "A.bar";  
  
    A() { foo(); }  
  
    public void foo() {  
        System.out.println("A.foo(): bar = " + bar);  
    }  
}
```

```
public class B extends A {  
    String bar = "B.bar";  
  
    B() { foo(); }  
  
    public void foo() {  
        System.out.println("B.foo(): bar = " + bar);  
    }  
}
```

```
public class D {  
    public static void main(String[] args) {  
        A a = new B();  
        System.out.println("a.bar = " + a.bar);  
        a.foo();  
    }  
}
```

The output is:

```
B.foo(): bar = null  
B.foo(): bar = B.bar  
a.bar = A.bar  
B.foo(): bar = B.bar
```



# Inheritance & Constructors

```
public class A {  
    protected B b = new B();  
    public A() { System.out.println("in A: no args."); }  
    public A(String s) { System.out.println("in A: s = " + s); }  
}
```

```
public class B {  
    public B() { System.out.println("in B: no args."); }  
}
```

```
public class C extends A {  
    protected B b;  
    public C() { System.out.println("in C: no args."); }  
    public C(String s) { System.out.println("in C: s = " + s); }  
}
```

```
public class D {  
    public static void main(String args[]) {  
        C c = new C();  
        A a = new C();  
    }  
}
```

The output is:

in B: no args.

in A: no args.

in C: no args.

in B: no args.

in A: no args.

in C: no args.

# Inheritance & Constructors

```
public class A {  
    protected B b = new B();  
    public A() { System.out.println("in A: no args."); }  
    public A(String s) { System.out.println("in A: s = " + s); }  
}
```

```
public class B {  
    public B() { System.out.println("in B: no args."); }  
}
```

```
public class C extends A {  
    protected B b;  
    public C() { System.out.println("in C: no args."); }  
    public C(String s) { System.out.println("in C: s = " + s); }  
}
```

```
public class D {  
    public static void main(String args[]) {  
        C c = new C("c");  
        A a = new C("a");  
    }  
}
```

The output is:

in B: no args.

in A: no args.

in C: s = c

in B: no args.

in A: no args.

in C: s = a

# Inheritance & Constructors

```
public class A {  
    protected B b = new B();  
    public A() { System.out.println("in A: no args."); }  
    public A(String s) { System.out.println("in A: s = " + s); }  
}
```

What will happen if we remove this line?

```
public class B {  
    public B() { System.out.println("in B: no args."); }  
}
```

```
public class C extends A {  
    protected B b;  
    public C() { System.out.println("in C: no args."); }  
    public C(String s) { System.out.println("in C: s = " + s); }  
}
```

```
public class D {  
    public static void main(String args[]) {  
        C c = new C("c");  
        A a = new C("a");  
    }  
}
```

# Inheritance & Constructors

```
public class A {
    String bar = "A.bar";
}

public class B extends A {
    String bar = "B.bar";

    B() { foo(); }

    public void foo() {
        System.out.println("B.foo(): bar = " + bar);
    }

    public static void main(String[] args) {
        A a = new B();
        System.out.println(a.bar);
        a.foo();
    }
}
```

Will this compile?  
Will there be a RTE?  
What is the result?

# בחינה באופק!

- הבחינה ב- 06.02
- כל הנושאים שכיסינו במהלך הסמסטר (שיעורים, תרגולים ועבודות בית)
- Java, DBC, יחשה ופולימורפיזם, IO, iterator, ...
- Generics, מחלקות פנימיות, Collection Framework, ...
- לפתור כמה שיותר מבחנים משנים שעברו
- לא כל הסמסטרים זהים

בהצלחה!