# Java Generics (#2) [Type Erasure]

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# Type Erasure

- To discuss type erasure, will use  simple, example parameterized type
- Encapsulates the idea of a generic “distance”

```
interface ISummable <T> {
    void addYourselfTo (T addToMe);
    T getNothing ();
}
```

# Type Erasure: What's the Deal?

- For backwards compatibility,
  - — No JVM changes were made to support generics
  - — Only the compiler was changed
- Result is that inside of generic code,
  - — If you've got an object of a generic type
  - — Can only run those ops compiler knows are supported via runtime polymorphism
  - — Can't do things you'd want to do, like call "new"

    Requires type-specific constructor!

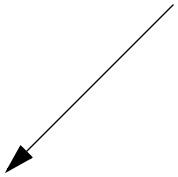
Called "type erasure" 'cause Java doesn't remember generic type past compilation

# What Is the Practical Effect?

```
class SummableSet <T extends ISummable <T>> {
    ArrayList <T> myData = new ArrayList <T> ();

    void addItem (T addMe) {
        myData.add (addMe);
    }
    T getSum () {
        T sum = null;
        for (T curItem : myData) {
            if (sum != null)
                curItem.addYourselfTo (sum);
            else
                sum =
                  curItem.addYourselfTo (curItem.getNothng ());
        }
        return sum;
    }
}
```

This is OK!



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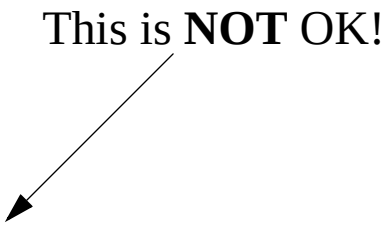

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    T getSum () {
        T sum = new T ();
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            curItem.addYourselfTo (sum);
        }
        return sum;
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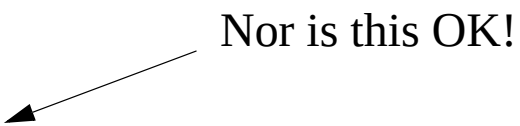
}
```



# How To Create Objcts of Parameter Type?

- Only way to create object is to include appropriate method in interface:

```
interface ISummable <T> {
    void addYourselfTo (T addToMe);
    T getNothing ();
}
```

# But This is Annoying

- Only way to create object is to include appropriate method in interface:

```
interface ISummable <T> {
    void addYourselfTo (T addToMe);
    T getNothing ();
}
```

- Consider the following... what is the problem?

```
T getSum () {
          T sum = null;
          for (T curItem : myData) {
               if (sum != null)
                    curItem.addYourselfTo (sum);
               else
                    sum = curItem.addYourselfTo (curItem.getNothing ());
          }
          return sum;
     }
}
```

# But This is Annoying

- Might we use static method to get around this?

```
interface ISummable <T> {
    void addYourselfTo (T addToMe);
    static T getNothing ();
}


class SummableSet <T extends ISummable <T>> {
     ArrayList <T> myData = new ArrayList <T> ();

     void addItem (T addMe) {
          myData.add (addMe);
     }
     T getSum () {
          T sum = T.getNothing ();
          for (T curItem : myData) {
               curItem.addYourselfTo (sum);
          }
          return sum;
     }
}
```

Now what is the problem?

# So Instead…

```
class SummableSet <T extends ISummable <T>> {
     ArrayList <T> myData = new ArrayList <T> ();

     void addItem (T addMe) {
          myData.add (addMe);
     }
     T getSum (T zreo) {
          T sum = zero;
          for (T curItem : myData) {
               curItem.addYourselfTo (sum);
          }
          return sum;
     }
}
```

- Really need to pass as a parameter
- Not too elegant
- Question: why is `T sum = zero;` okay?

# Questions?