NOTE: Java 7 is used for this demo.

```
public class SampleClass extends BaseClass1 {
	private int i;
	private String str;
}
```

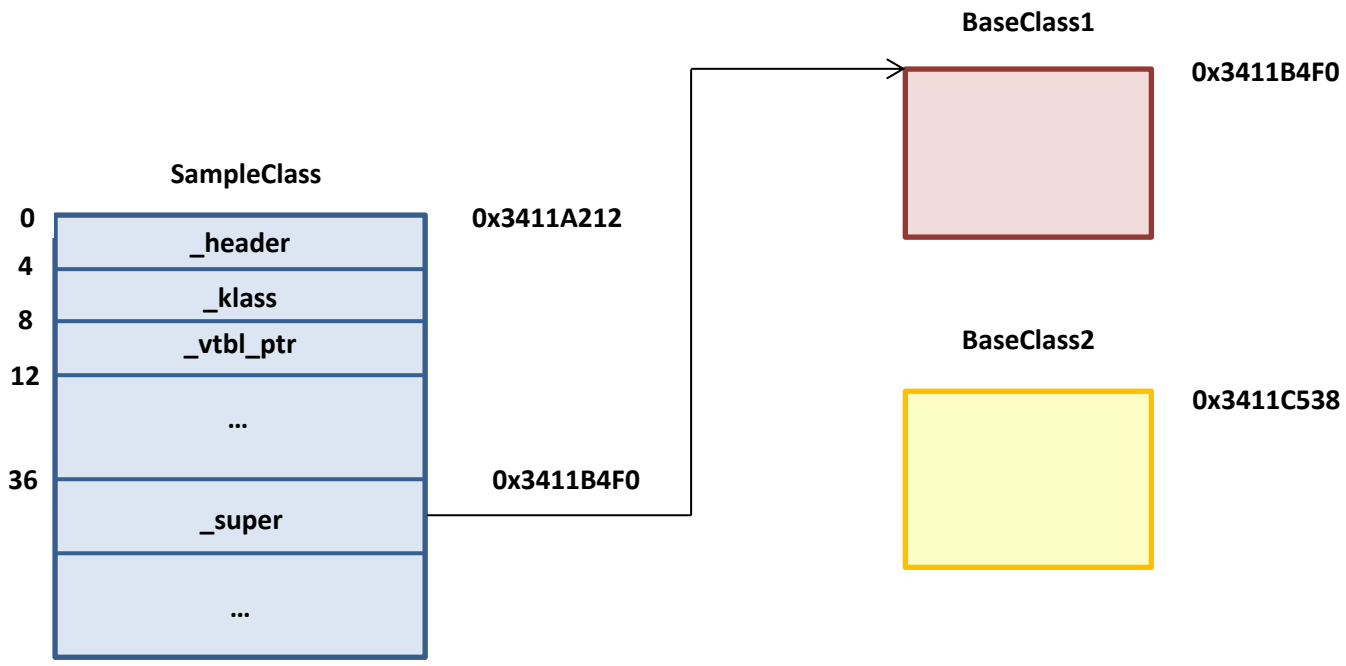
```
public class BaseClass1 {
	protected char c;
}
```

Reference:
http://hg.openjdk.java.net/jdk7/hotspot/hotspot/file/9b0ca45cd756/src/share/vm/oops/klass.hpp

```
//  Klass layout:
//    [header         ] klassOop
//    [klass pointer  ] klassOop
//    [C++ vtbl ptr   ] (contained in Klass_vtbl)
//    [layout_helper  ]
//    [super_check_offset   ] for fast subtype checks
//    [secondary_super_cache] for fast subtype checks
//    [secondary_supers     ] array of 2ndary supertypes
//    [primary_supers 0]
//    [primary_supers 1]
//    [primary_supers 2]
//    ...
//    [primary_supers 7]
//    [java_mirror    ]
//    [super          ]
//    [name           ]
//    [first subklass]
//    [next_sibling   ] link to chain additional subklasses
//    [modifier_flags]
//    [access_flags   ]
//    [verify_count   ] - not in product
//    [alloc_count    ]
//    [last_biased_lock_bulk_revocation_time] (64 bits)
//    [prototype_header]
```

```
For 32 bit JVM
        [header               ] 4 byte
        [klass pointer        ] 4 byte
        [C++ vtbl ptr         ] 4 byte
        [layout_helper        ] 4 byte
        [super_check_offset   ] 4 byte
        [secondary_super_cache] 4 byte
        [secondary_supers     ] 4 byte (because of pointer to array)
        [primary_supers       ] 4 byte (because of pointer to array)
        [java_mirror          ] 4 byte
        [super                ] 4 byte
```

For 32 bit JVM, as you can see offset of **"super"** field is **"36"**.

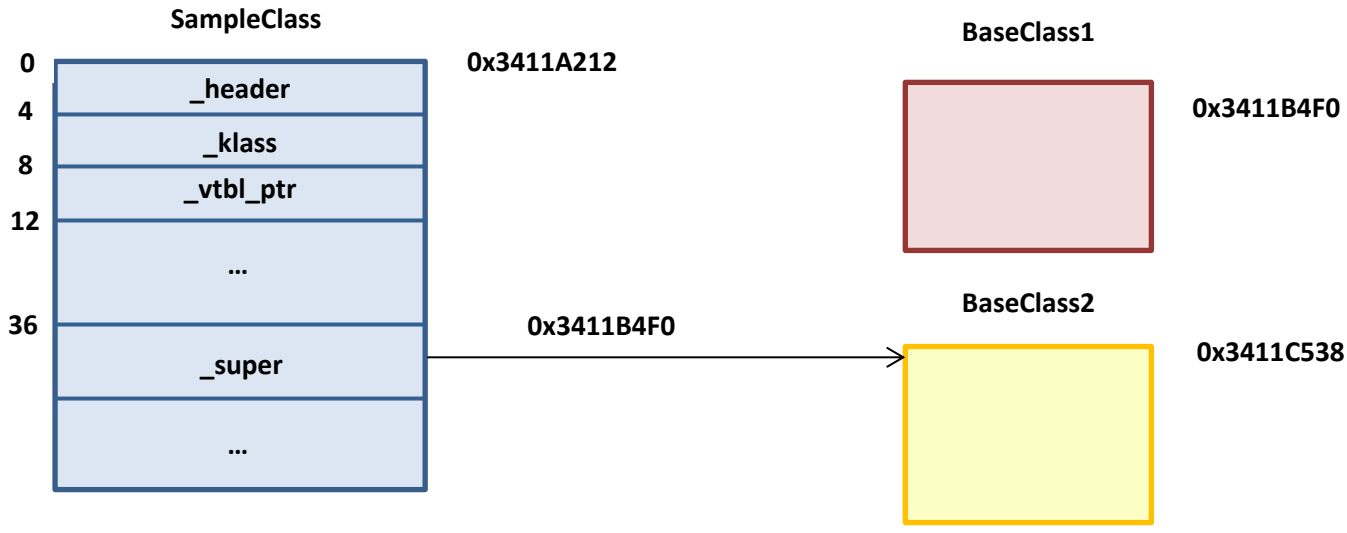



```
try {
	BaseClass2 baseObj1 = (BaseClass2)(Object)new SampleClass();  // ClassCastException
} catch (ClassCastException e) {
	e.printStackTrace();
}
long addressOfClass = JvmUtil.addressOfClass(SampleClass.class);     // 0x3411A212
long addressOfBaseClass2 = JvmUtil.addressOfClass(BaseClass2.class); // 0x3411C538

// Set super class pointer of "SampleClass" to "BaseClass2" class address
unsafe.putLong(addressOfClass + 36, addressOfBaseClass2);

try {
	BaseClass2 baseObj2 = (BaseClass2)(Object)new SampleClass();  // No Exception
} catch (ClassCastException e) {
	e.printStackTrace();
}
```

After executing code above;



After executing code above;

Memory layout of **“SampleClass”** class (128 bytes from its starting address):

```
[0x0000]: 01 00 00 00 a8 08 97 38 2c 7a 87 65 18 00 00 00
[0x0010]: 28 00 00 00 40 9f 6e 04 00 00 00 00 00 f7 37
[0x0020]: 00 00 97 38 38 c5 11 34 a0 c6 11 34 00 00 00 00
[0x0030]: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
[0x0040]: 40 87 5d 24 38 c5 11 34 00 00 00 00 00 00 00 00
[0x0050]: 09 00 00 00 21 00 20 20 00 00 00 00 00 00 00 00
[0x0060]: 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00
[0x0070]: 00 00 00 02 00 00 00 00 a0 c9 11 34 20 c3 11 34
```

As you can see, **highlighted field** is address of **“BaseClass2”** class.

Memory layout of **“BaseClass2”** class (128 bytes from its starting address):

```
[0x0000]: 01 00 00 00 a8 08 97 38 2c 7a 87 65 10 00 00 00
[0x0010]: 24 00 00 00 a8 b0 9e 00 00 00 00 00 00 f7 37
[0x0020]: 00 00 97 38 38 c5 11 34 00 00 00 00 00 00 00 00
[0x0030]: 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00
[0x0040]: d0 86 5d 24 00 00 97 38 a0 c6 11 34 60 bd 11 34
[0x0050]: 09 00 00 00 21 00 20 20 00 00 00 00 00 00 00 00
[0x0060]: 00 00 00 00 00 00 00 00 01 00 00 00 00 00 00 00
[0x0070]: 00 00 ff 01 00 00 00 00 58 c8 11 34 90 c4 11 34
```

As you can see, **highlighted field** is address of **“BaseClass2”** class (**BaseClass2** class has no super class, so its super class itself).

You can access all demo codes from https://github.com/serkan-ozal/jillegal-classredefine-demo

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https://github.com/serkan-ozal