

JVM Instructions — Stack Manipulation

0	nop	Do nothing
87	pop	Pop top stack word
88	pop2	Pop 2 top stack words
89	dup	Duplicate top stack word
92	dup2	Duplicate top 2 stack words
90	dup_x1	Duplicate top stack word and put 2 down†
93	dup2_x1	Duplicate top 2 stack words and put 2 down
91	dup_x2	Duplicate top stack word and put 3 down
94	dup2_x2	Duplicate top 2 stack words and put 3 down
95	swap	Swap top 2 stack words

† where put n down means insert the value n places into the stack, e.g. dup_x1 does:

$..., value2, value1 \Rightarrow ..., value1, value2, value1$

Constant Pool

- ◆ the “#12” in the disassembly is an index into the constant pool for the object
- ◆ for `invokestatic` the index is to a `CONSTANT_Methodref_info` structure

```
CONSTANT_Methodref_info {  
  u1 tag;  
  u2 class_index;   
  u2 name_and_type_index;  
}
```

class information

```
CONSTANT_Methodref_info {  
  u1 tag;  
  u2 name_index;  
}
```

method information

instance name

```
CONSTANT_Methodref_info {  
  u1 tag;  
  u2 name_index;   
  u2 descriptor_index;  
}
```

method name

method descriptor

```
CONSTANT_Methodref_info {  
  u1 tag;  
  u2 length;  
  u1 bytes[length];  
}
```