

Identifying Equivalent Objects to Reduce Memory Consumption

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A little about objects

- Creating an object is easy

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Object new

My application creates lots of objects. Do I need them all?

Color Example

```
Builder>>createNode  
  ^ GraphicalElement new color: self defaultColor.
```

```
Builder>>defaultColor  
"Gray color"  
^ Color r: 0.5 g: 0.5 b: 0.5
```

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Object Equivalence

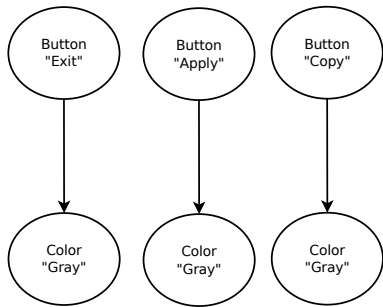
What means Object Equivalence?

Two objects o_1 and o_2 are said equivalent if all objects pointing to o_1 may instead point to o_2 without affecting the program semantics and execution.

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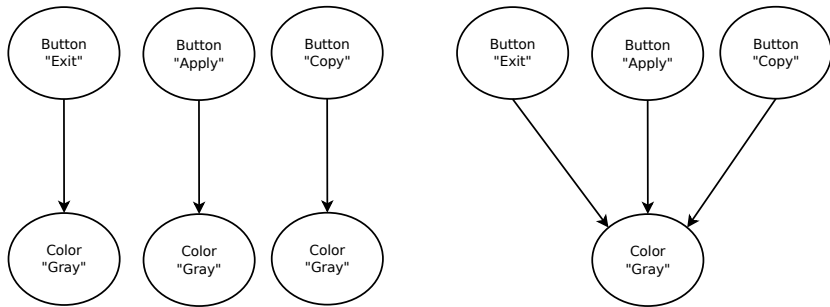
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Definition:

Our object equivalence definition says that o_1 and o_2 are equivalent if:

- o_1 and o_2 are instances of the same class.
- o_1 and o_2 have identical state.
- o_1 and o_2 do not mutate.
- Neither o_1 nor o_2 uses his identity. (i.e. `identityHash`)
- The creation of o_1 nor o_2 preforms a side effect.

Memory Profiler

- Groups the objects in the execution using the previous definition.

Unnecessary Objects

Detected that 10.97% of the objects are unnecessary object.

Reduction on the total number of Objects

Allowed us to reduce the total number of objects in 5.1%.

Conclusions and Future Work

What we achieved?

- Successfully identified redundant objects in the case.
- Successfully removed some of the redundant objects.

And now?

More strategies to remove unnecessary objects.

