

Implementing Classes

TICAE
types



ICAE
inheritance
super



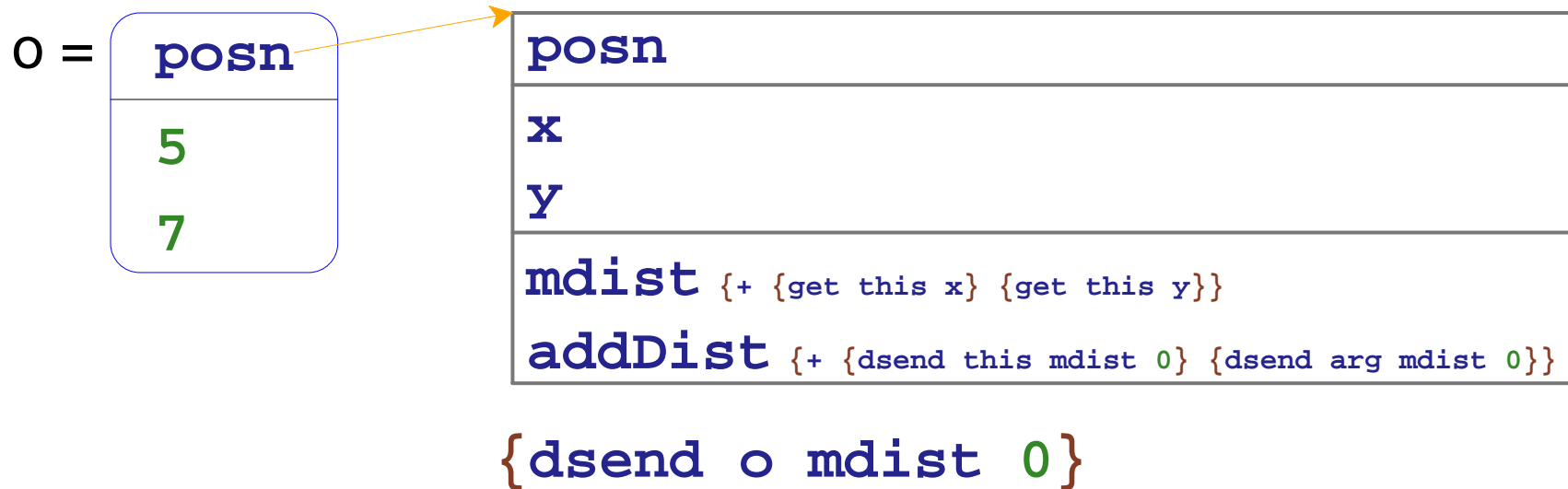
CAE
method dispatch
fields

```
{class posn extends object
  x : num y : num
  {mdist : num -> num
    {+ {get this x} {get this y}}}}
  {addDist : posn -> num
    {+ {send this mdist 0} {send arg mdist 0}}}}
{class posn3D extends posn
  z : num
  {mdist : num -> num
    {+ {get this z} {super mdist arg}}}}
{send {new posn3D 7 5 3} mdist 0}
```

```
{class posn extends object
  x y
  {mdist {+ {get this x} {get this y}}}}
  {addDist {+ {send this mdist 0} {send arg mdist 0}}}}
{class posn3D extends posn
  z
  {mdist {+ {get this z} {super mdist arg}}}}
{send {new posn3D 7 5 3} mdist 0}
```

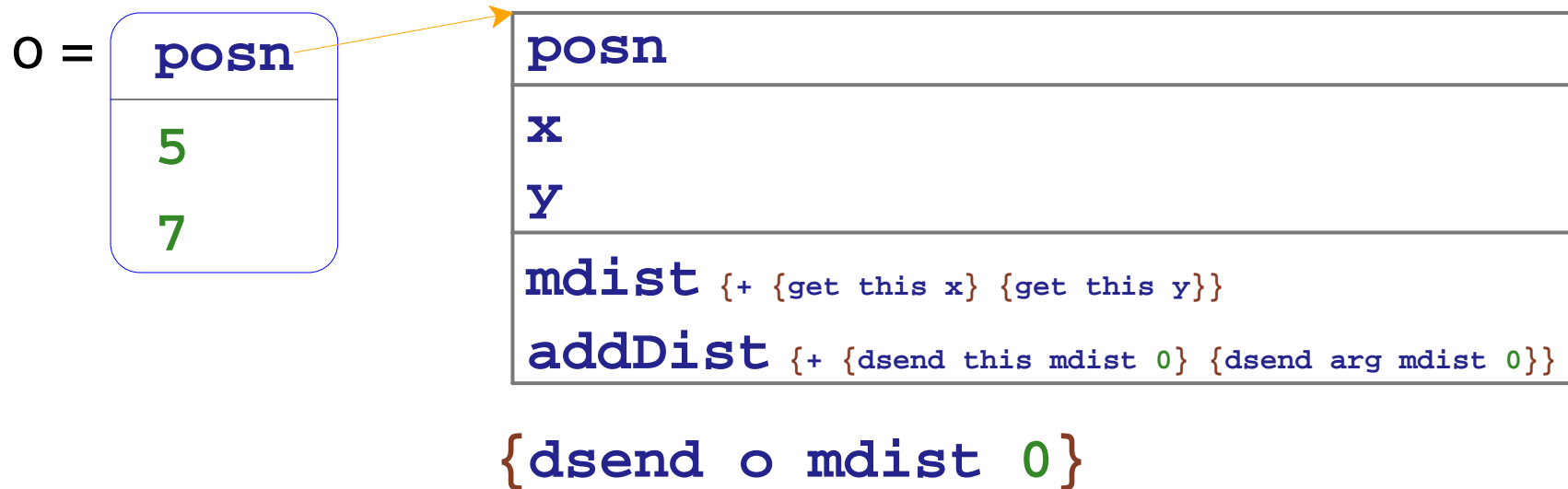
```
{class posn
  x y
  {mdist {+ {get this x} {get this y}}}}
  {addDist {+ {dsend this mdist 0} {dsend arg mdist 0}}}}
{class posn3D
  x y z
  {mdist {+ {get this z} {ssend this posn mdist arg}}}}
  {addDist {+ {dsend this mdist 0} {dsend arg mdist 0}}}}
{dsend {new posn3D 7 5 3} mdist 0}
```

Run-Time Dispatch by Name



dsend follows reference to class table, searches method list

Run-Time Dispatch by Name

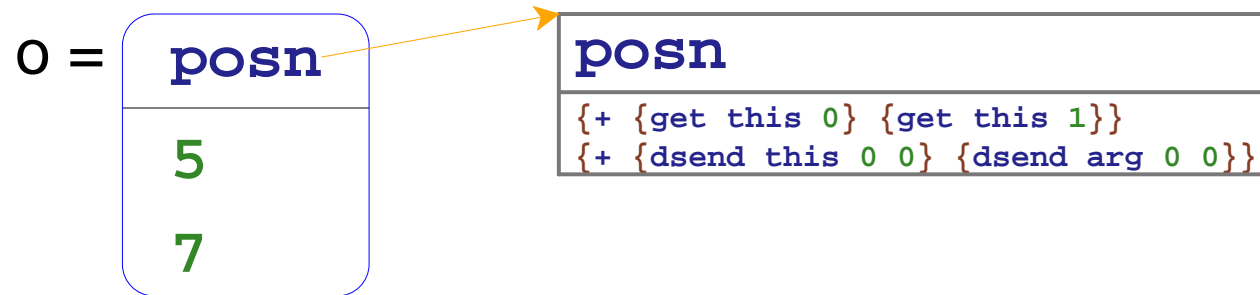


```
{class posn extends object
  x : num y : num
  {mdist : num -> num
    {+ {get this x} {get this y}}}
  {addDist : posn -> num
    {+ {send this mdist 0} {send arg mdist 0}}}}
```

⇒ typechecking ensures
search will succeed

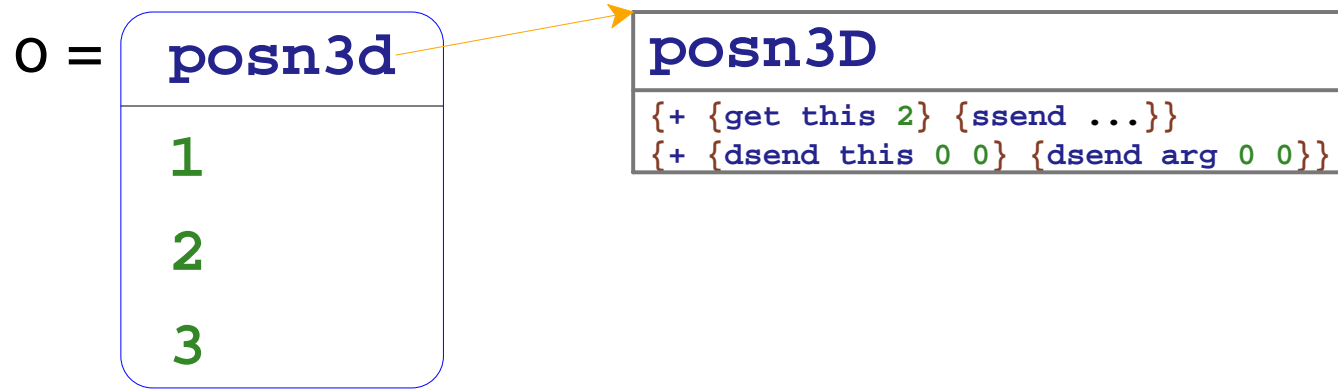
If we order methods in expansion, method will always be first in list

Run-Time Dispatch by Position



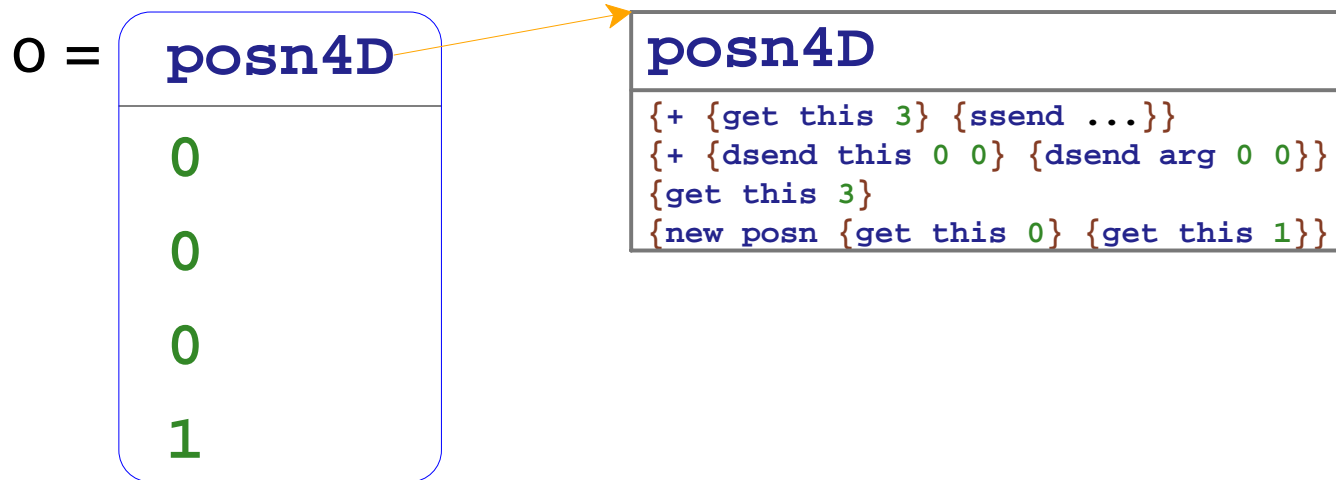
{dsend 0 0 0}

Run-Time Dispatch by Position



`{dsend 0 0 0}`

Run-Time Dispatch by Position



{dsend 0 0 0}

Compiling Classes

TICAE

no change

```
{class posn extends object
  x : num  y : num
  {mdist : num -> num
    {+ {get this x} {get this y}}}
  {addDist : posn -> num
    {+ {send this mdist 0} {send arg mdist 0}}}}
{class posn3D extends posn
  z : num
  {mdist : num -> num
    {+ {get this z} {super mdist arg}}}}
{send {new posn3D 7 5 3} mdist 0}
```



CICAE

*name class in
each method call*

```
{class posn extends object
  x y
  {mdist {+ {get this x} {get this y}}}
  {addDist {+ {send this posn mdist 0} {send arg posn mdist 0}}}}
{class posn3D extends posn
  z
  {mdist {+ {get posn3d this z} {super mdist arg}}}}
{send {new posn3D 7 5 3} posn3d mdist 0}
```



CCAE

*methods and fields
as positions*

```
{class posn 2
  {mdist {+ {get this 0} {get this 1}}}
  {addDist {+ {dsend this 0 0} {dsend arg 0 0}}}}
{class posn3D 3
  {mdist {+ {get this z} {ssend this {+ {get this 0} {get this 1}}
    arg}}}
  {addDist {+ {dsend this 0 0} {dsend arg 0 0}}}}
{dsend {new posn3D 7 5 3} 0 0}
```