Automatically Deriving Test Data for Julia Functions

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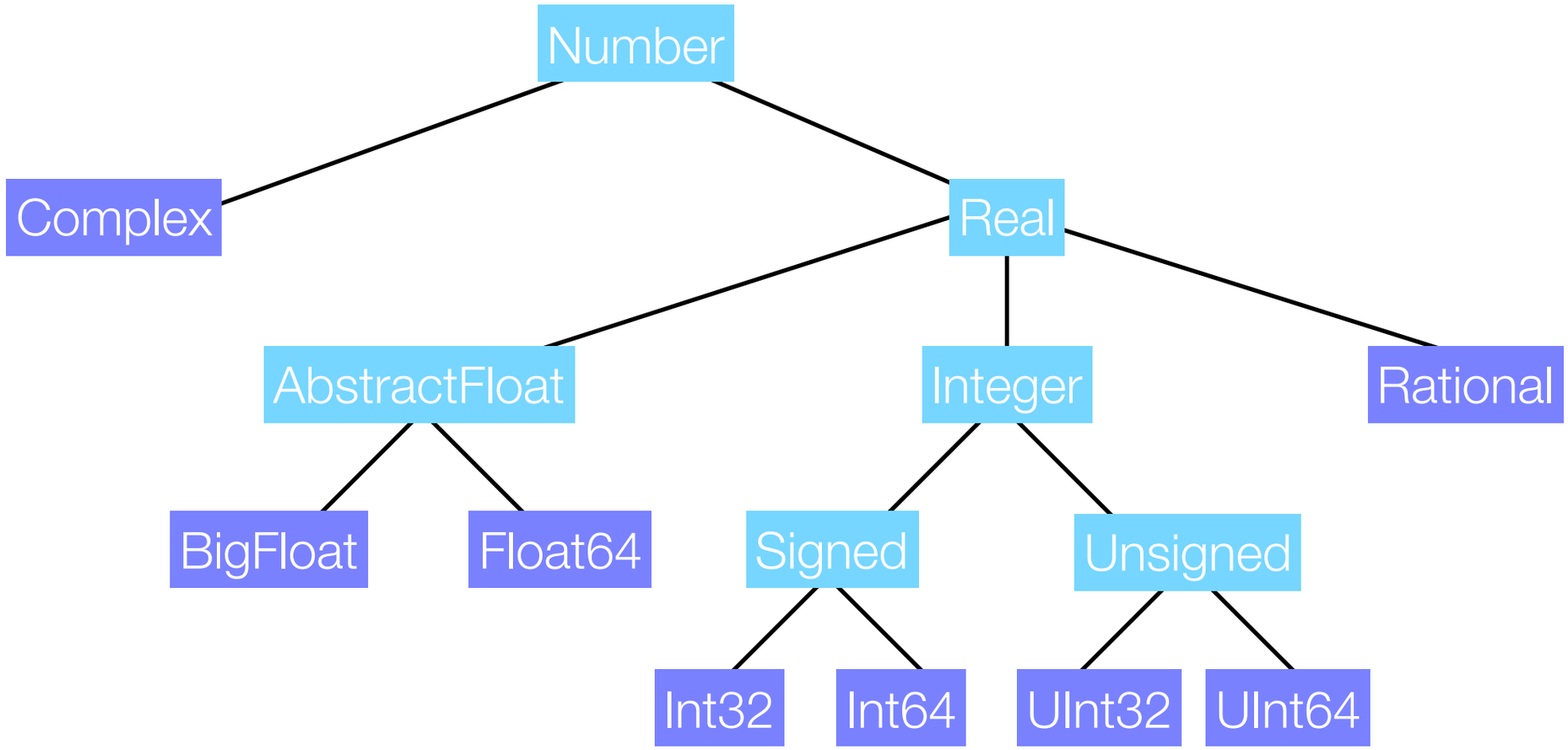
Typically …

random testing: inputs are diverse **values**

Multiple Dispatch …

random testing: inputs are diverse **values and types**


Number
Complex
Real
AbstractFloat
Integer
Rational
BigFloat
Float64
Signed
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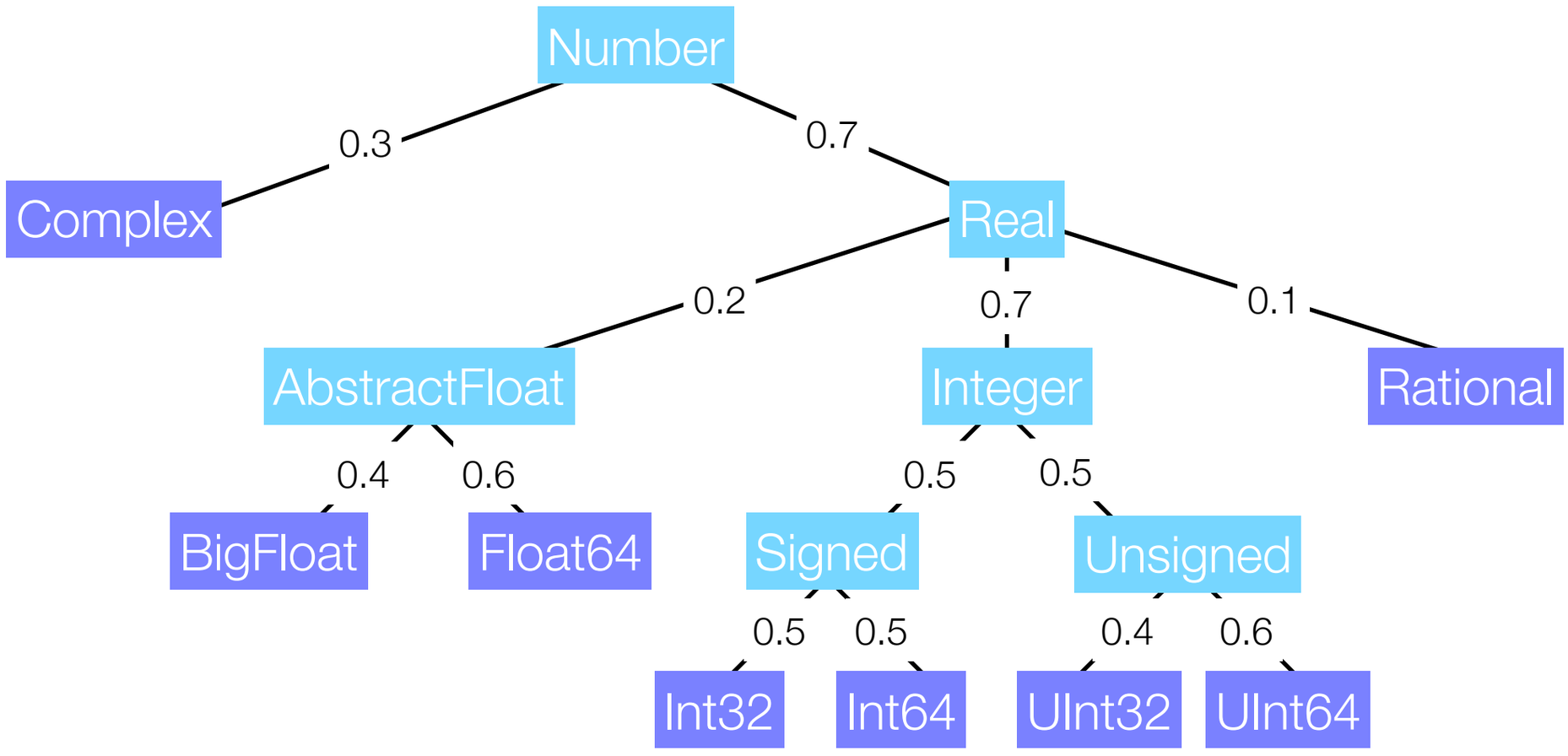
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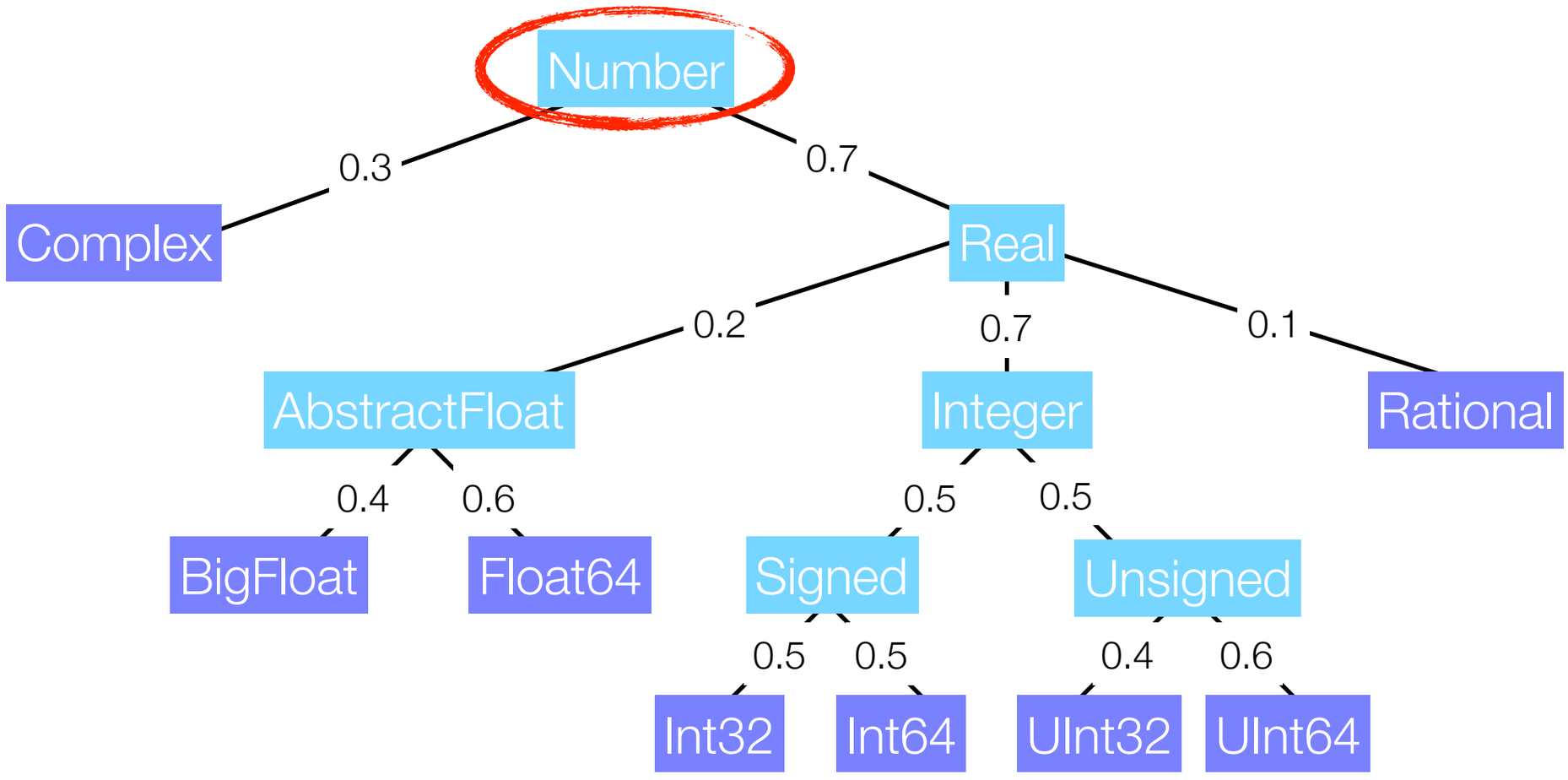
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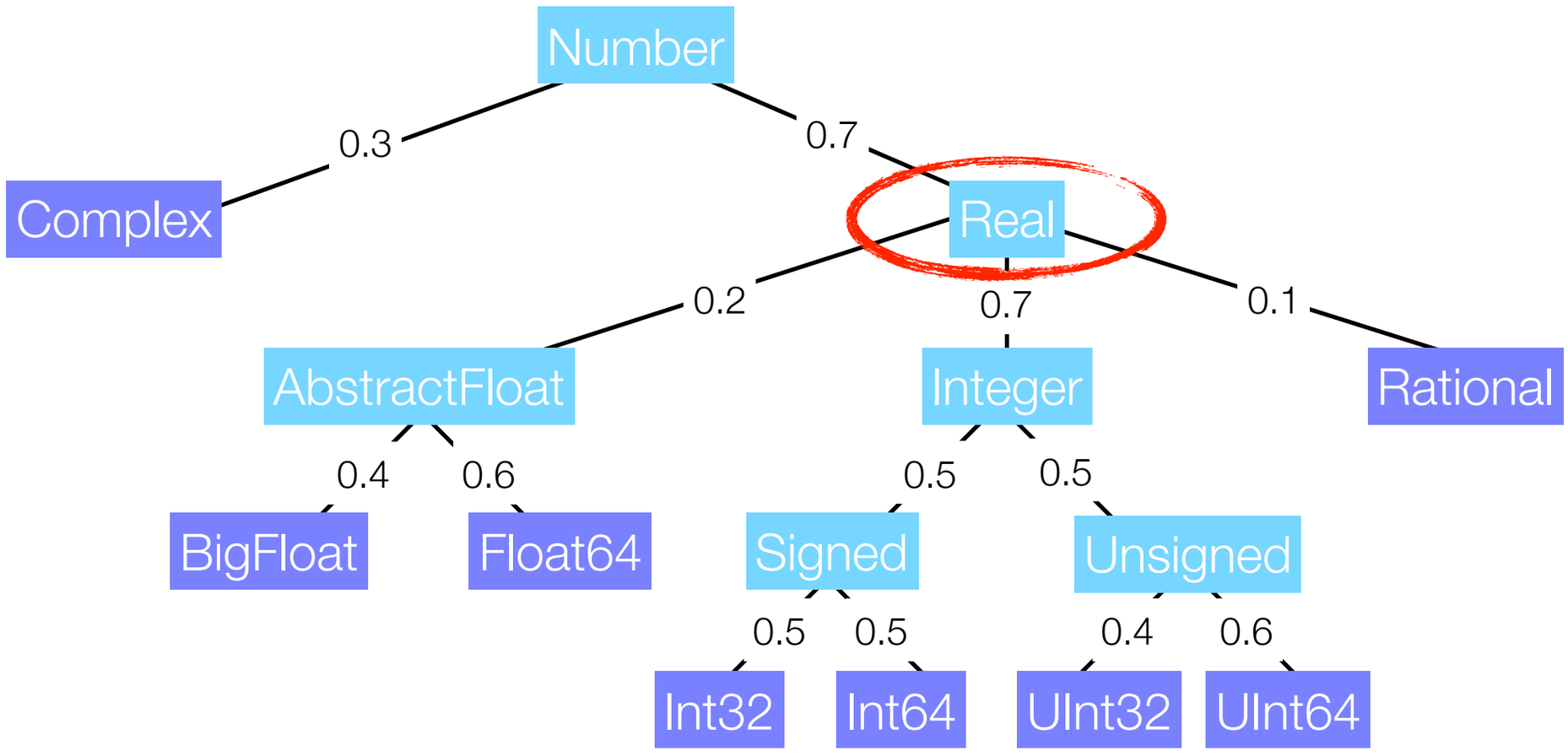
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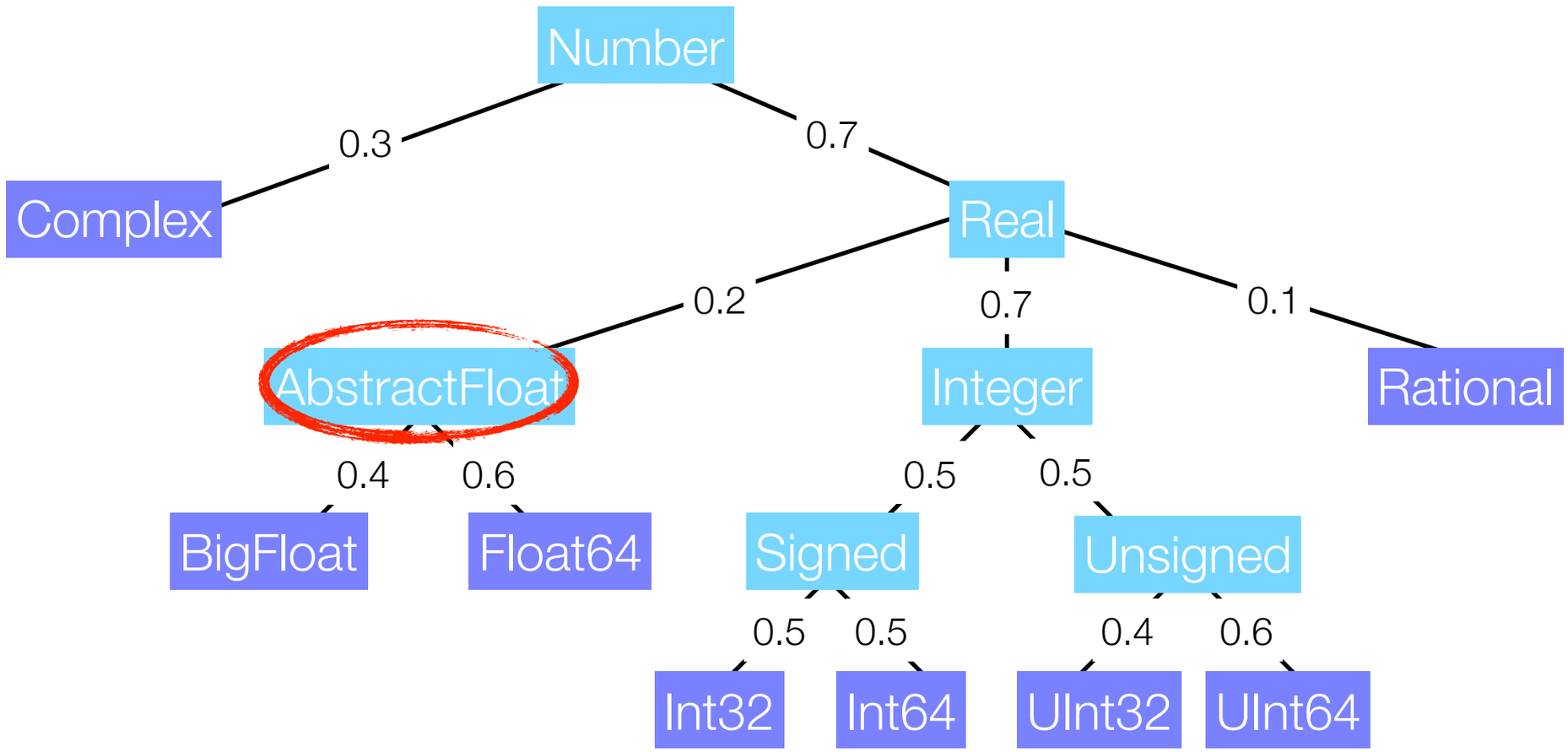
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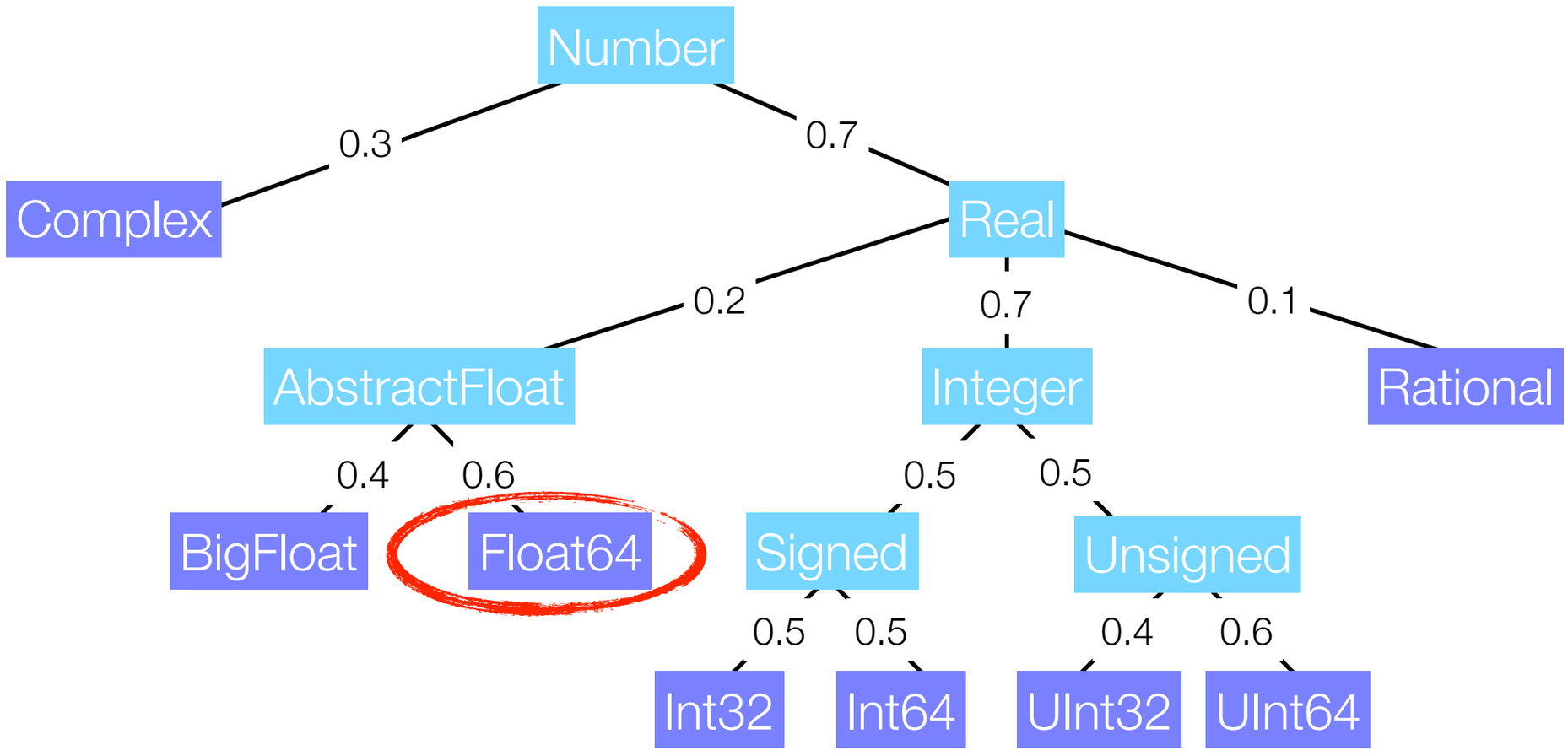
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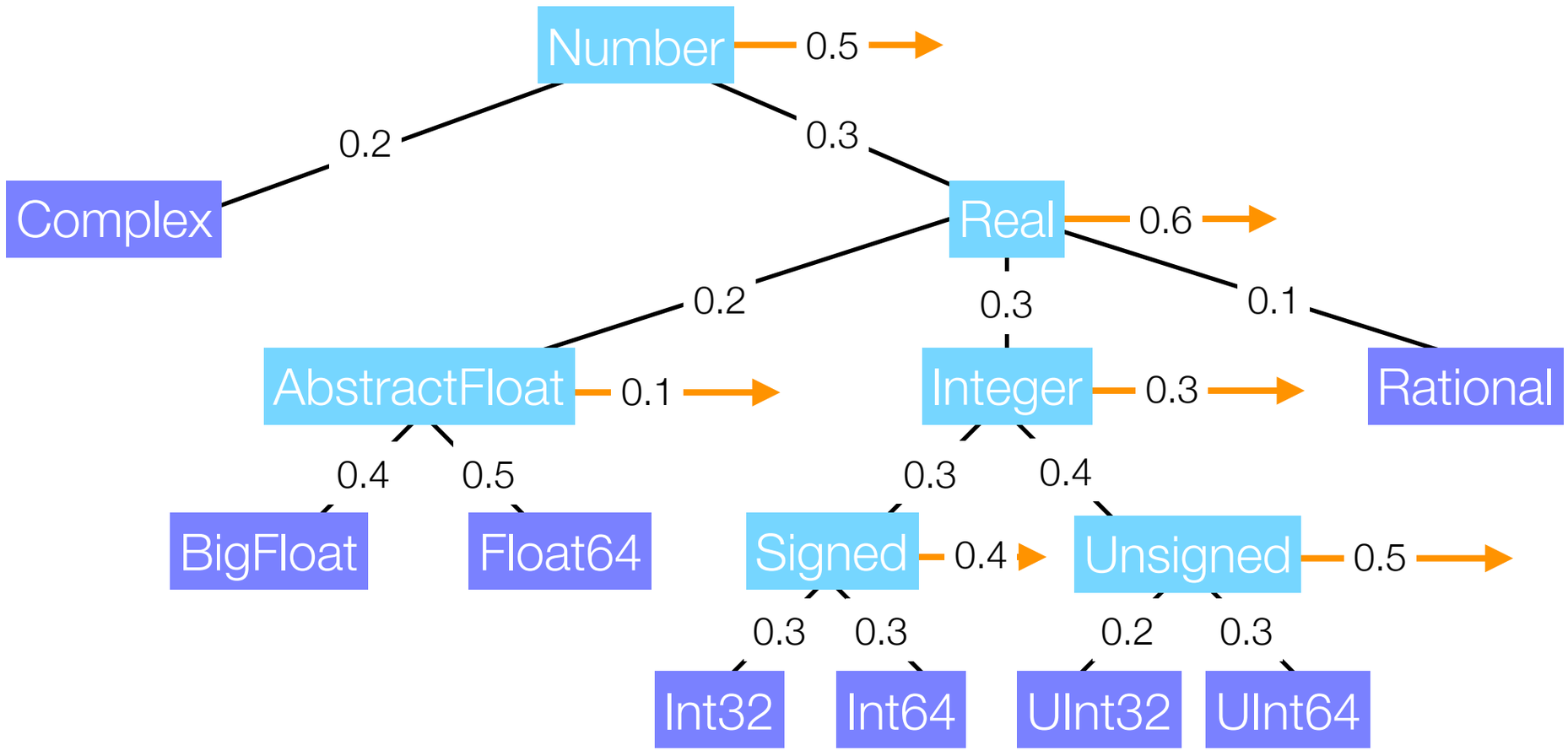
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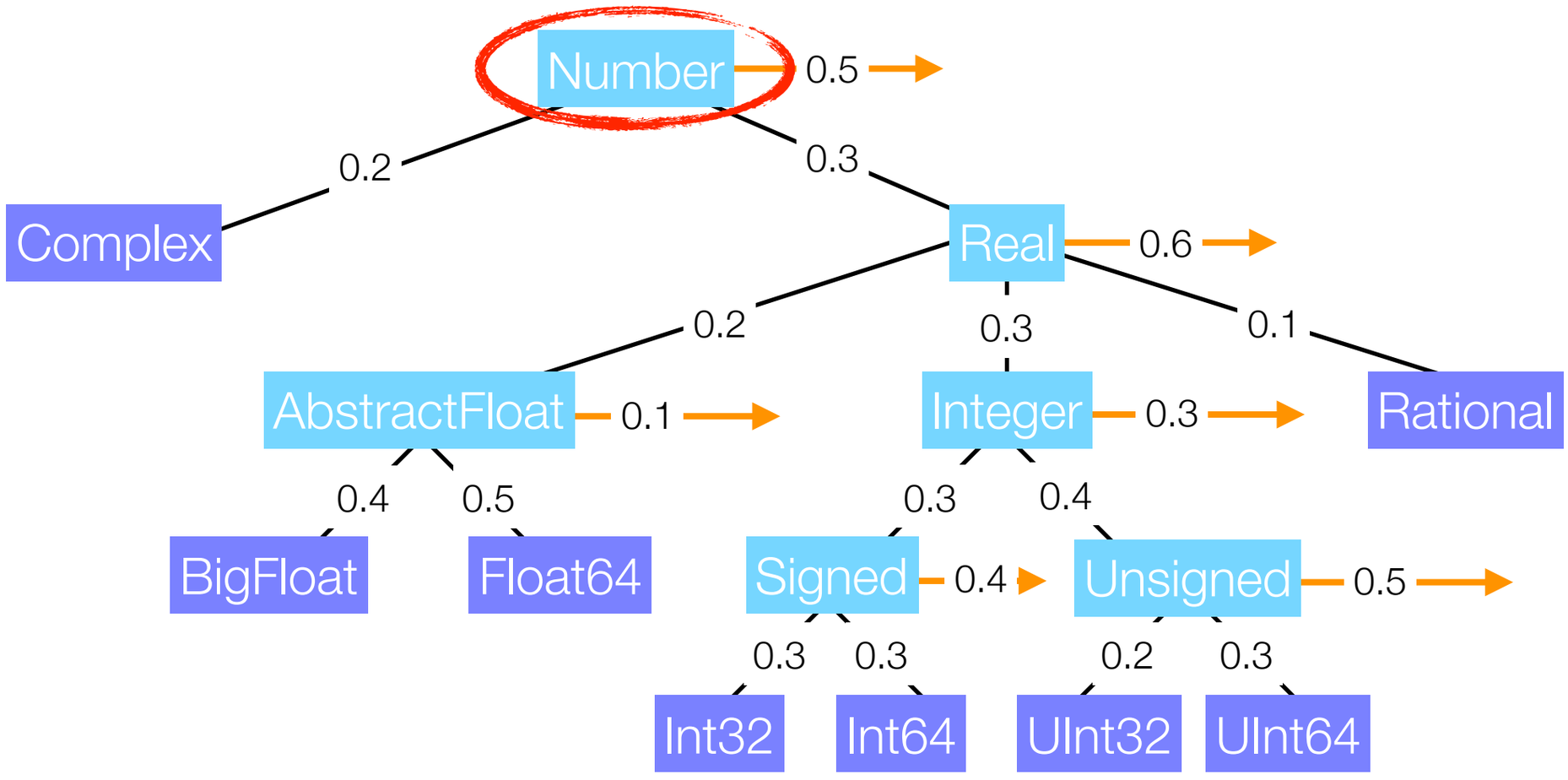
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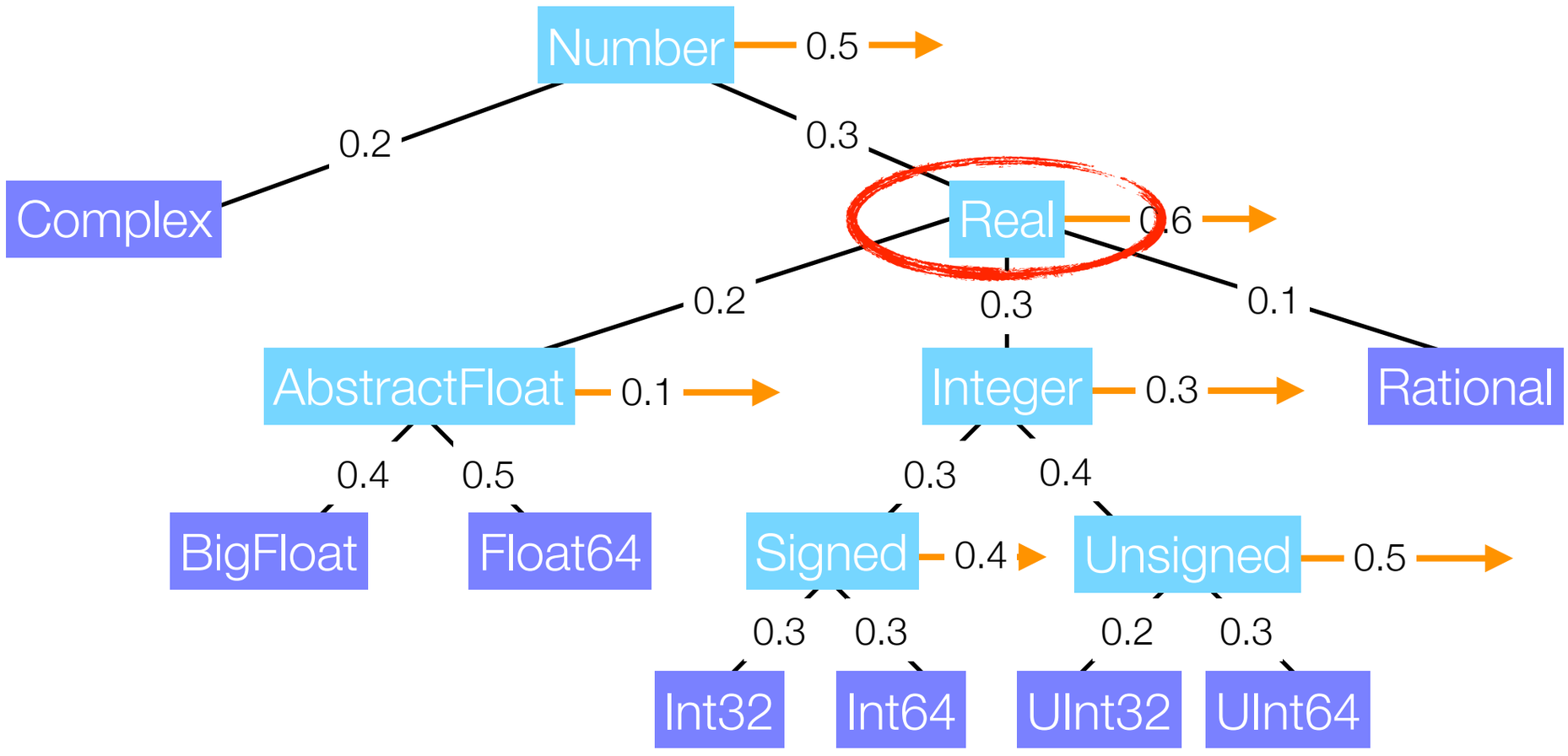
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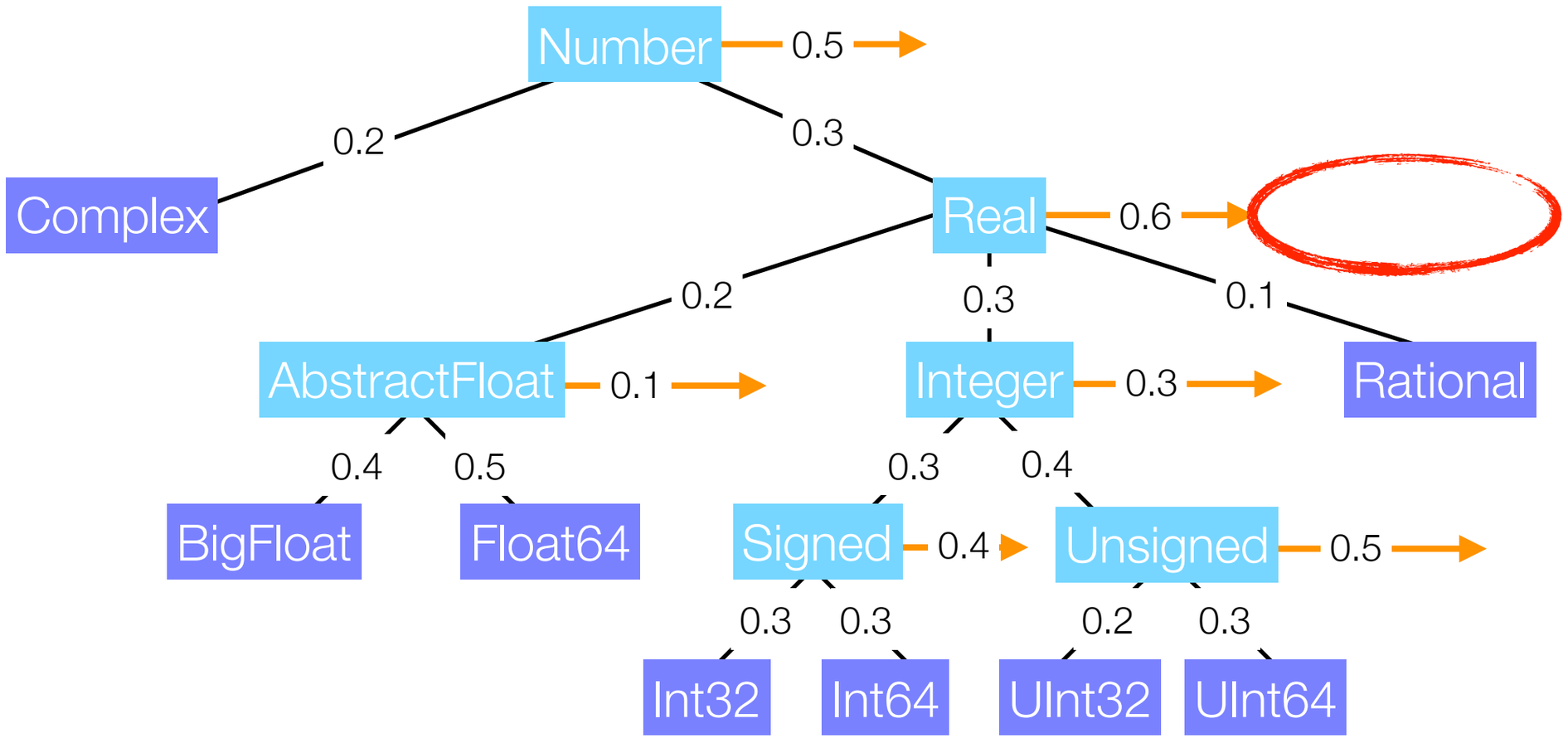
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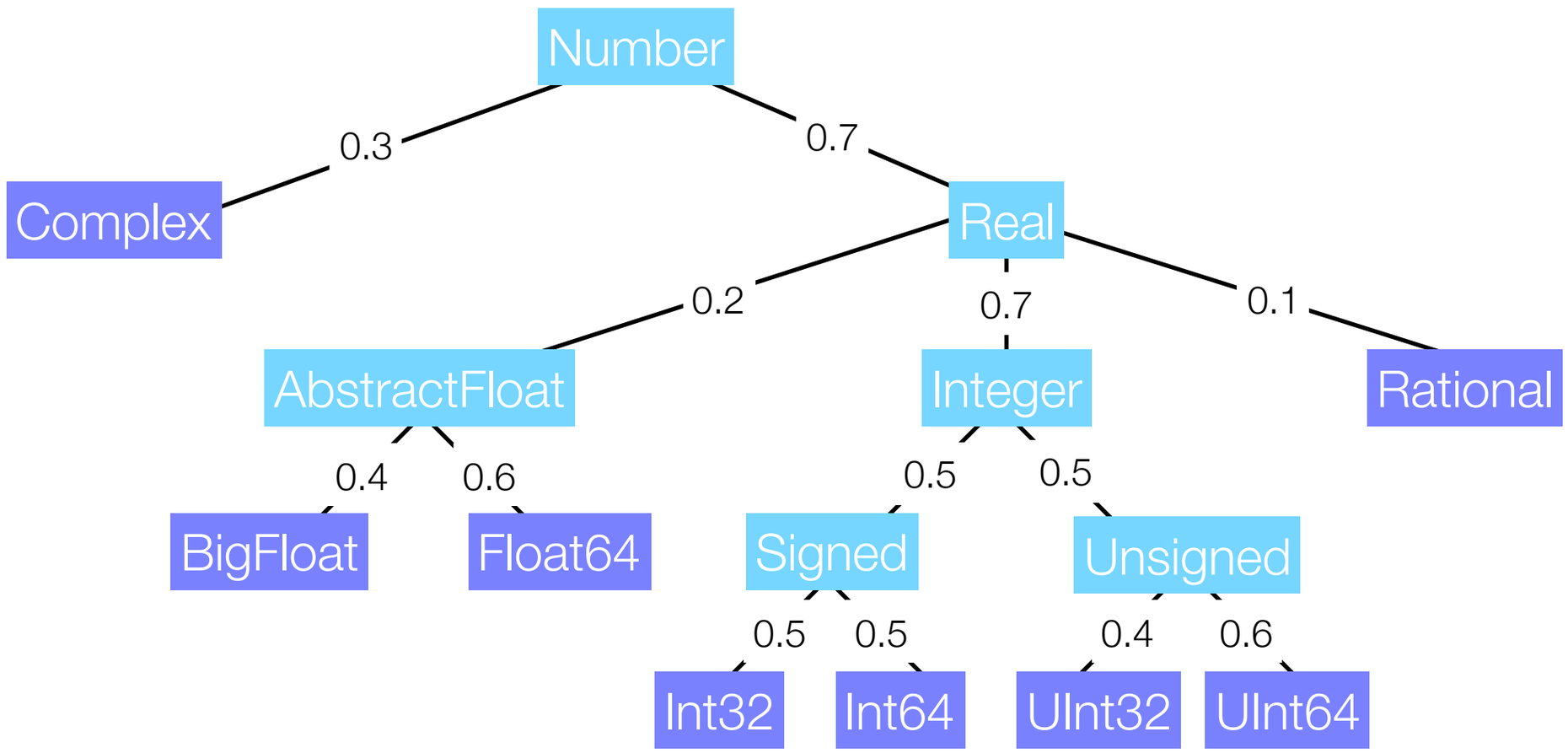
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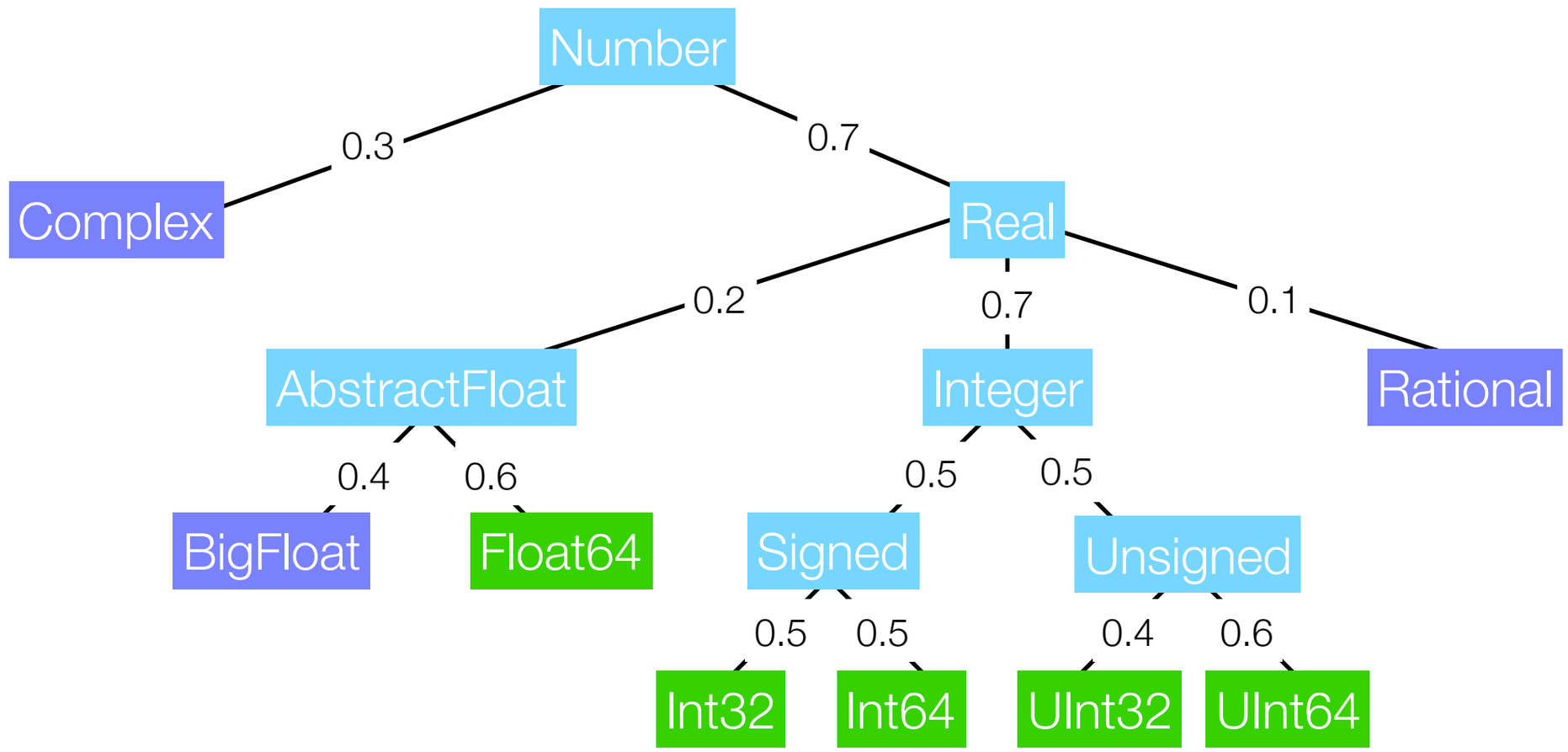
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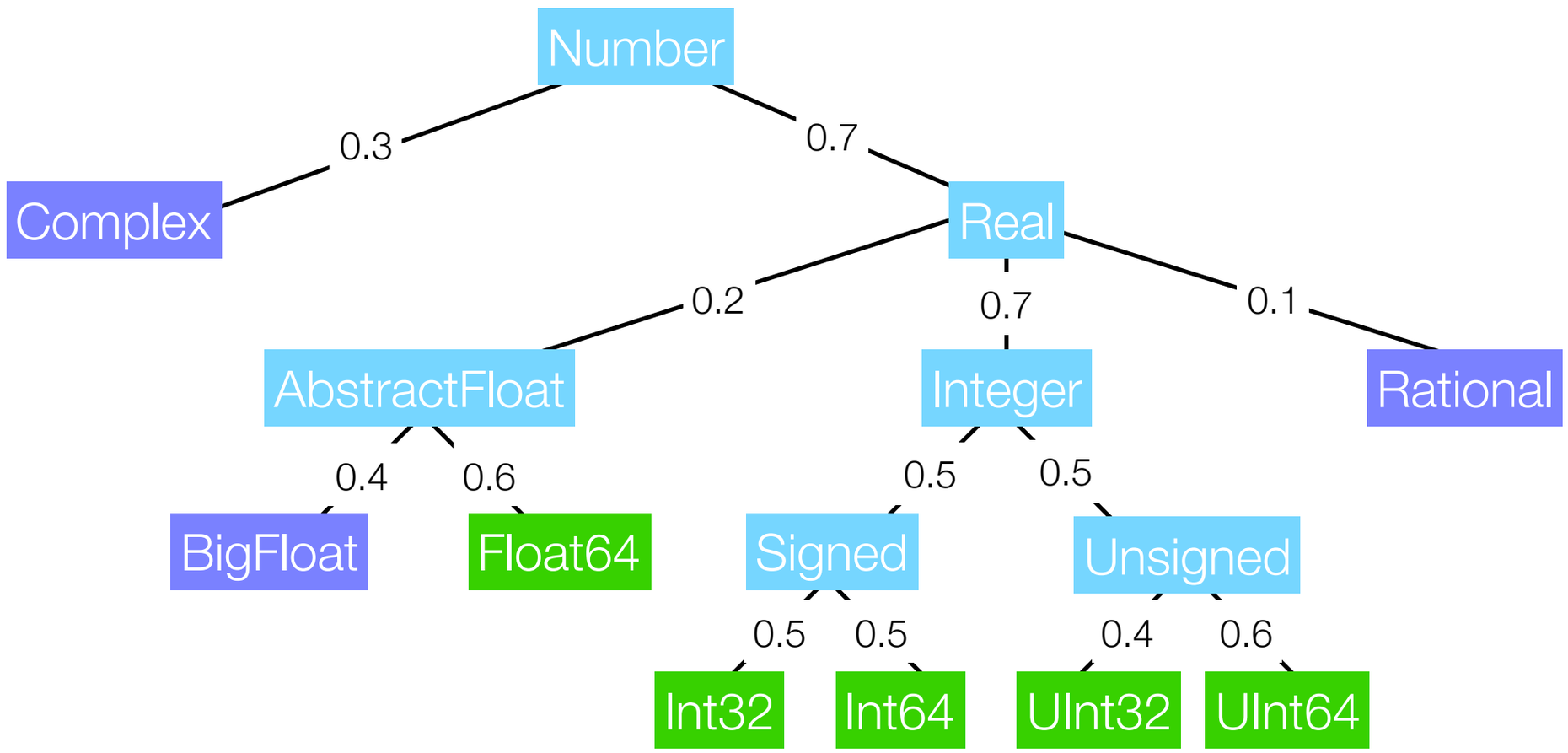
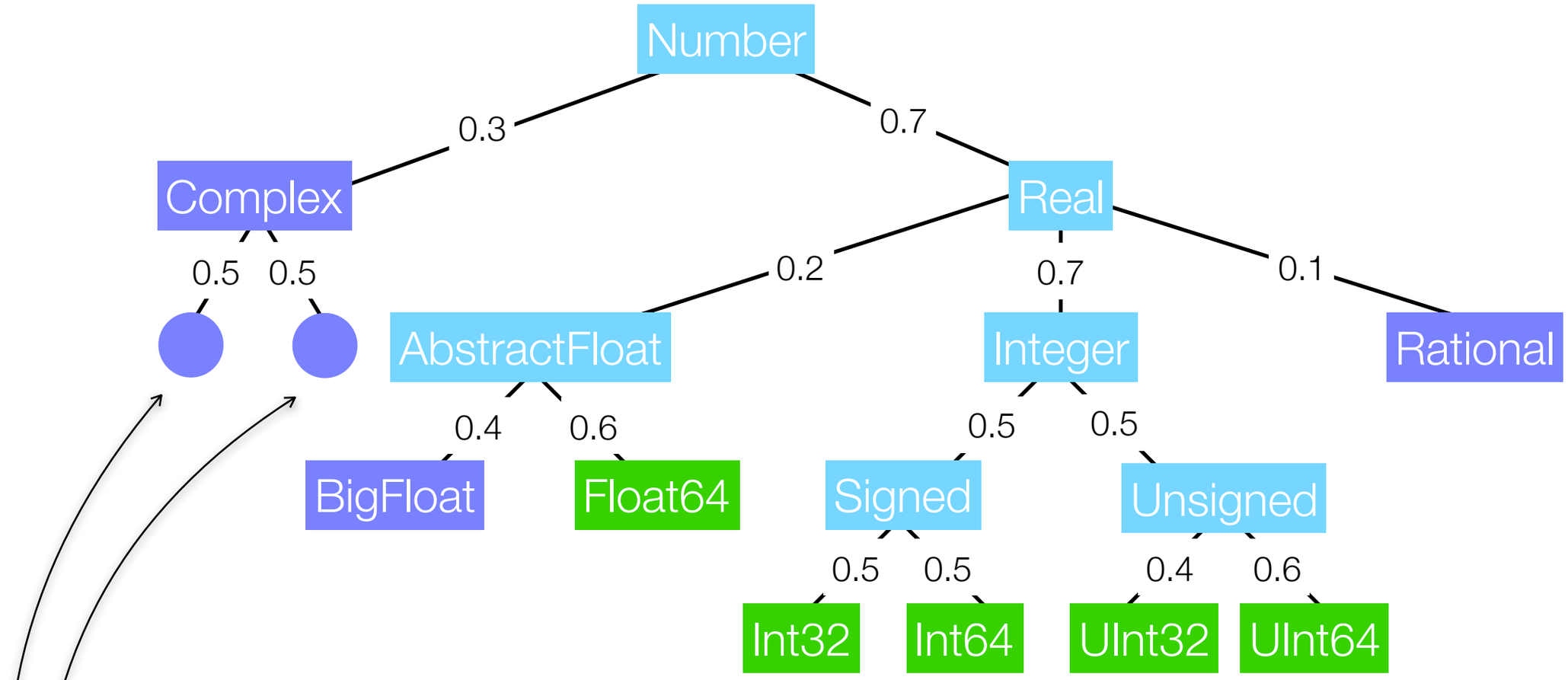



```
Complex(x::Real)

Complex(re::Real, im::Real)
```

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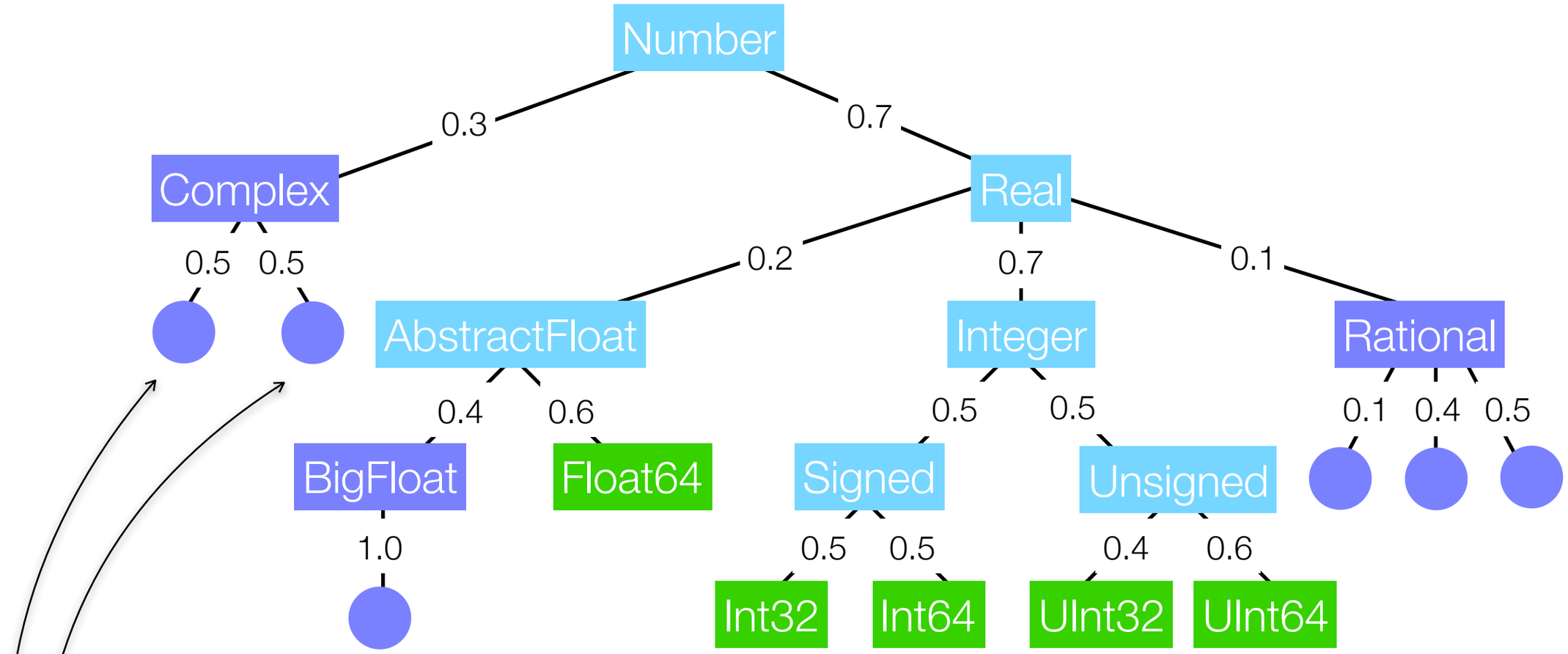


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```
using DataGeneratorTranslators
using DataGenerators

type_generator(:NumberGen, Number)

for i in 1:20
    try
        x = choose(NumberGen)
        dump(x)
    catch _e
        if !isa(_e, DataGeneratorTranslators.TypeGenerationException)
            rethrow(_e)
        end
        warn("exception raised in constructor method")
    end
end
```

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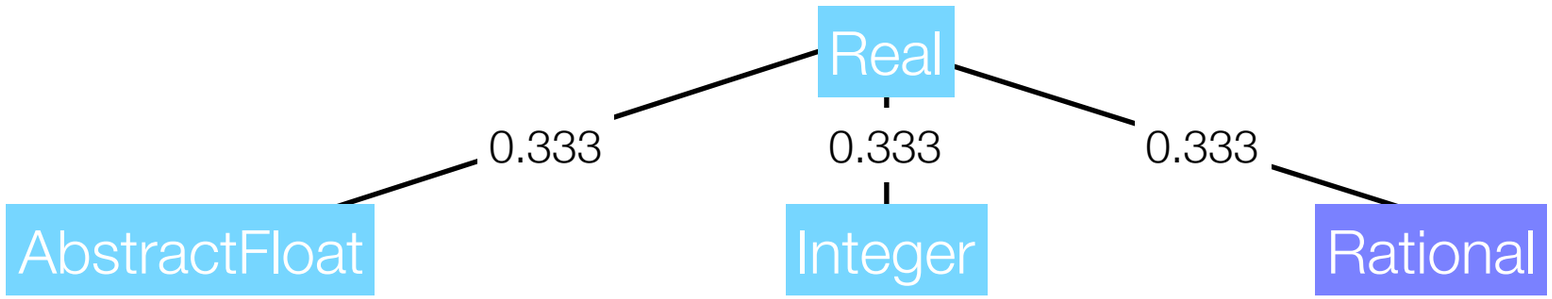
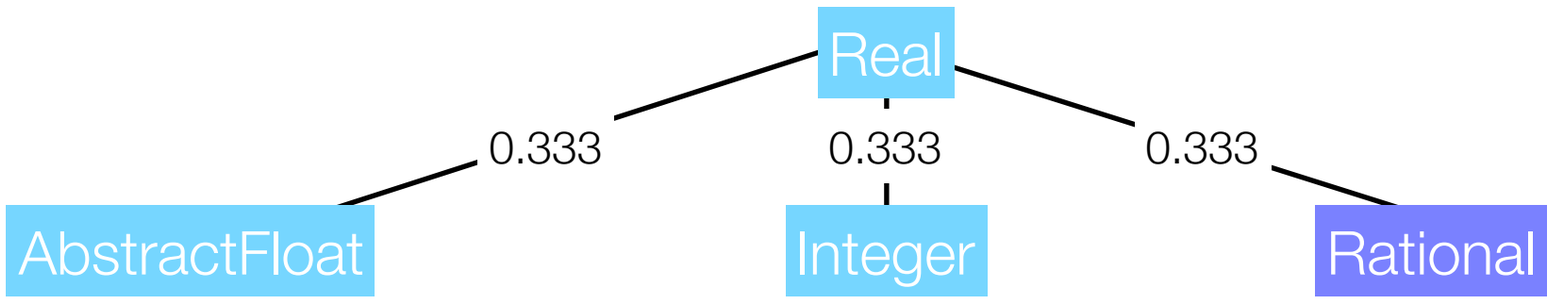

Real
0.333
0.333
0.333
AbstractFloat
Integer
Rational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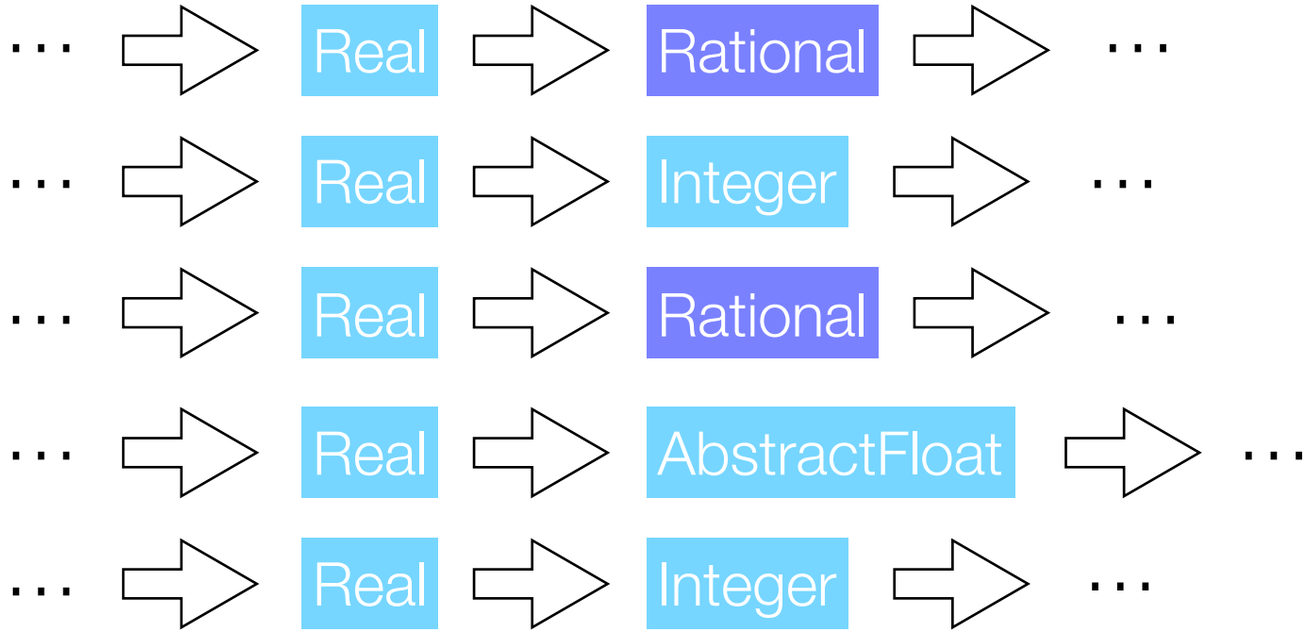
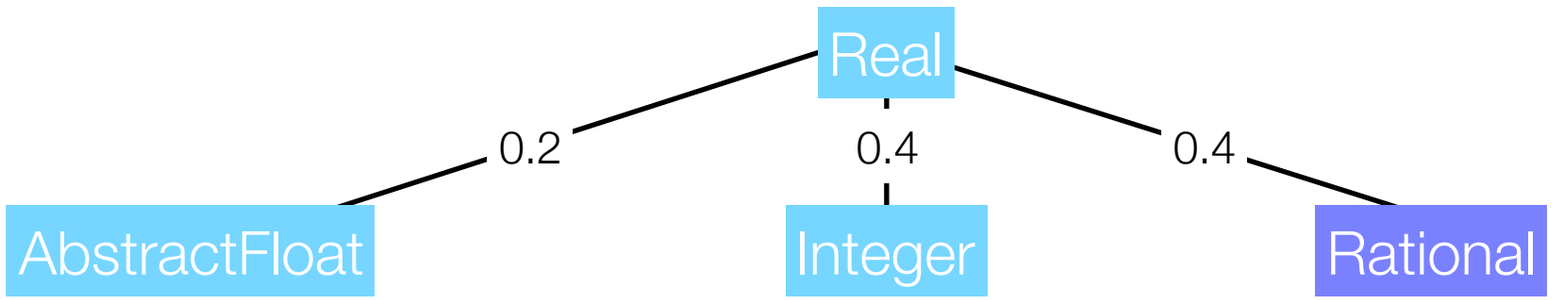

… Real Rational …
… Real Integer …
… Real Rational …
… Real AbstractFloat …
… Real Integer …


Real
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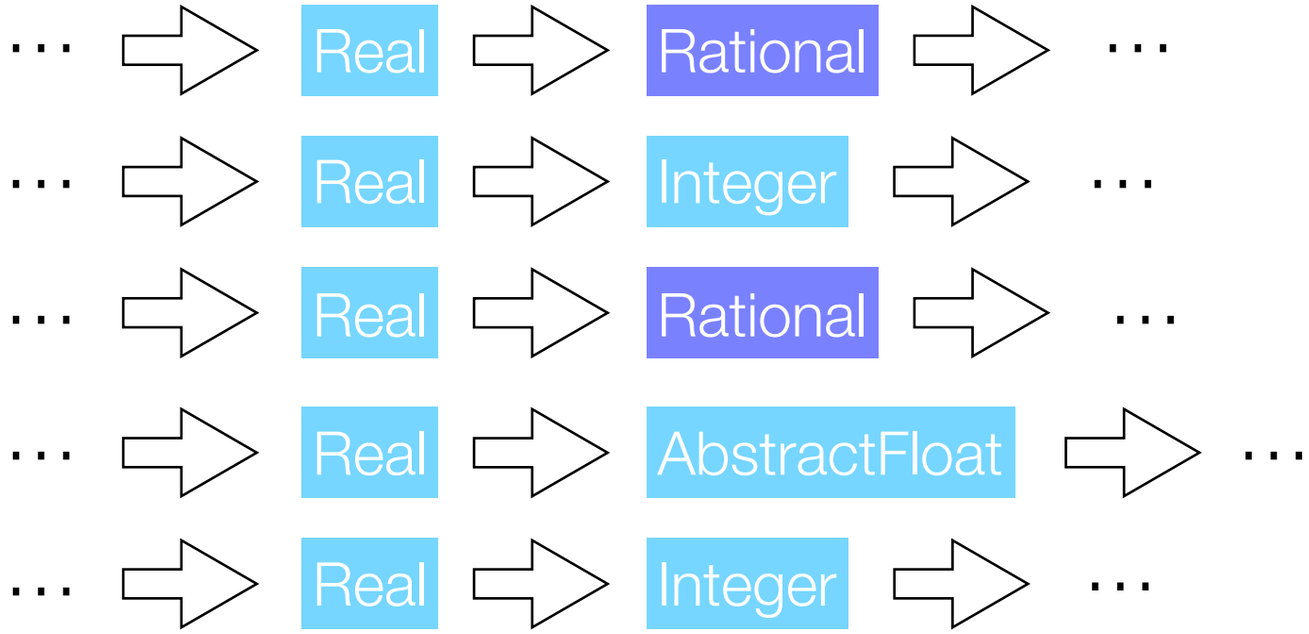
… Real Rational …
… Real Integer …
… Real Rational …
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… Real Integer …

```
type_generator(:NumberGen, Number)
g = NumberGen()

for j in 1:5

    besttraces = Vector{Any}()

    for i in 1:100
        try
            x, state = generate(g)
            dump(x)
            push!(besttraces, state.cmtrace)
        catch _e
            if !isa(_e, DataGeneratorTranslators.TypeGenerationException)
                rethrow(_e)
            end
            warn("exception raised in constructor method")
        end
    end

    estimateparams!(choicemodel(g), besttraces)

end
```

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end
```

```
@testset "fuzz test +" begin

    type_generator(:AddSigGen, Tuple{Number, Number})
    g = AddSigGen()

    for j in 1:5

        besttraces = Vector{Any}()

        for i in 1:100
            try
                x, state = generate(g)
                dump(x)
                push!(besttraces, state.cmtrace)
                res = try +(x...) catch _f _f end
                @test any(t->isa(res, t),
                      [Number, InexactError, OverflowError, DivideError,])
             catch _e
            ...
        end

        estimateparams!(choicemodel(g), besttraces)

    end

end
```

```
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    end

end
```

https://github.com/simonpoulding/DataGeneratorTranslators.jl 0.6 soon

https://github.com/simonpoulding/DataGenerators.jl

Simon Poulding and Robert Feldt,
Automated Random Testing in Multiple Dispatch Languages,
Intn'l Conf. on Software Testing, Verification and Validation (ICST) 2017
www.simonpoulding.net/papers/icst_2017_preprint.pdf

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