

```
In [1]: Pkg.build("ImageView") # we need ImageView - this is a once only thing
```

```
INFO: Building Homebrew
From https://github.com/Homebrew/homebrew
8f3e0ff..9a2df07 master -> origin/master
```

```
HEAD is now at 9a2df07 mecab-ko: fix dicdir path
HEAD is now at 4c5030e Add bottles for newly versioned glpk formulae
```

```
INFO: Building Images
INFO: Building Cairo
```

```
==> Installing dependencies for pango: staticfloat/juliadeps/icu4c, staticfloat/juliadeps/harfbuzz, staticfloat/juliadeps/
onfig, staticfloat/juliadeps/gobject-introspection
==> Installing pango dependency: staticfloat/juliadeps/icu4c
==> Downloading https://juliabottles.s3.amazonaws.com/icu4c-52.1.mavericks.bottle.2.tar.gz
Already downloaded: /Users/rharper/Library/Caches/Homebrew.jl/icu4c-52.1.mavericks.bottle.2.tar.gz
==> Pouring icu4c-52.1.mavericks.bottle.2.tar.gz
==> Caveats
This formula is keg-only, which means it was not symlinked into /Users/rharper/.julia/v0.3/Homebrew/deps/usr.
```

```
Conflicts; see: https://github.com/Homebrew/homebrew/issues/issue/167
```

Generally there are no consequences of this for you. If you build your own software and it requires this formula, you'll need to add to your build variables:

```
LDFLAGS: -L/Users/rharper/.julia/v0.3/Homebrew/deps/usr/opt/icu4c/lib
CPPFLAGS: -I/Users/rharper/.julia/v0.3/Homebrew/deps/usr/opt/icu4c/include
```

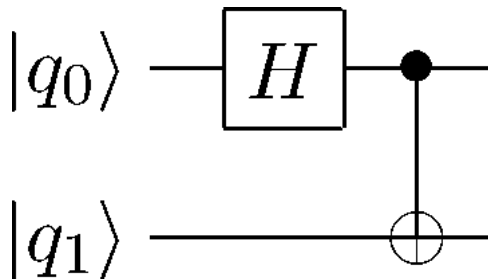
```
==> Summary
📦 /Users/rharper/.julia/v0.3/Homebrew/deps/usr/Cellar/icu4c/52.1: 239 files, 60M
==> Installing pango dependency: staticfloat/juliadeps/harfbuzz
==> Downloading https://downloads.sf.net/project/machomebrew/Bottles/harfbuzz-0.9.33.mavericks.bottle.tar.gz
==> Pouring harfbuzz-0.9.33.mavericks.bottle.tar.gz
📦 /Users/rharper/.julia/v0.3/Homebrew/deps/usr/Cellar/harfbuzz/0.9.33: 72 files, 2.9M
==> Installing pango dependency: staticfloat/juliadeps/fontconfig
==> Downloading https://juliabottles.s3.amazonaws.com/fontconfig-2.11.1.mavericks.bottle.tar.gz
==> Pouring fontconfig-2.11.1.mavericks.bottle.tar.gz
==> /Users/rharper/.julia/v0.3/Homebrew/deps/usr/Cellar/fontconfig/2.11.1/bin/fc-cache -frv
📦 /Users/rharper/.julia/v0.3/Homebrew/deps/usr/Cellar/fontconfig/2.11.1: 448 files, 3.6M
==> Installing pango dependency: staticfloat/juliadeps/gobject-introspection
==> Downloading https://juliabottles.s3.amazonaws.com/gobject-introspection-1.40.0.mavericks.bottle.1.tar.gz
==> Pouring gobject-introspection-1.40.0.mavericks.bottle.1.tar.gz
📦 /Users/rharper/.julia/v0.3/Homebrew/deps/usr/Cellar/gobject-introspection/1.40.0: 192 files, 9.9M
==> Installing pango
==> Downloading https://juliabottles.s3.amazonaws.com/pango-1.36.5.mavericks.bottle.1.tar.gz
==> Pouring pango-1.36.5.mavericks.bottle.1.tar.gz
📦 /Users/rharper/.julia/v0.3/Homebrew/deps/usr/Cellar/pango/1.36.5: 126 files, 4.6M
To relink: brew unlink pango && brew link pango
```

```
INFO: Building Tk
```

```
In [109]: using ImageView, Images
img = imread("test1.png") # just test its working
```

```
WARNING: OSX reader: indexed color images not implemented
```

```
Out[109]:
```



```
In [4]: require("Initial.jl")
        require("Symplectic.jl")
        decompose(23)
```

Tableau for unitary:

```
+IZXI
+ZZXI
+IIXI
+IIIX
-----
+XXII
+XIXI
+ZYYI
+IIIZ
setup(4)
hadamard(4)
hadamard(3)
hadamard(2)
hadamard(1)
cnot(3,2)
cnot(3,1)
hadamard(3)
cnot(2,3)
cnot(2,1)
cnot(1,2)
hadamard(4)
output(svec)
```

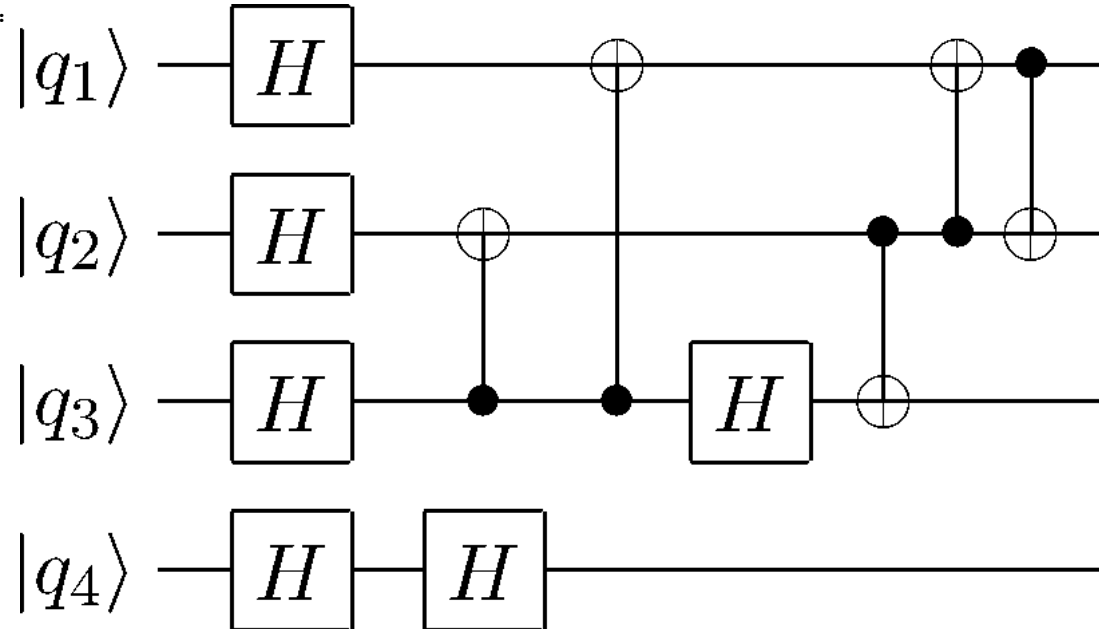
```
In [5]: commands # this is the list of commands generated by decompose
        # it will be used to draw the circuit
```

```
Out[5]: 13-element Array{ASCIIString,1}:
 "setup(4) "
 "hadamard(4) "
 "hadamard(3) "
 "hadamard(2) "
 "hadamard(1) "
 "cnot(3,2) "
 "cnot(3,1) "
 "hadamard(3) "
 "cnot(2,3) "
 "cnot(2,1) "
 "cnot(1,2) "
 "hadamard(4) "
 "output(svec) "
```

In [105]: `drawCircuit()`

```
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' TeX output 2014.09.02:1716' -> temp.eps
</usr/local/texlive/2014/texmf-dist/dvips/base/tex.pro>
</usr/local/texlive/2014/texmf-dist/dvips/base/texps.pro>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmr8.pfb>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmmi10.pfb>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmsy10.pfb>
[1]
WARNING: OSX reader: indexed color images not implemented
```

Out[105]:



In [106]: `decompose(48)`
`drawCircuit()`

```

+XIYI
+IXII
+ZIZI
+IIIX
-----
+ZIII
+IZII
+ZIXI
+IIIZ
setup(4)
cnot(3,1)
phase(4)
phase(4)
phase(2)
phase(2)
phase(4)
phase(3)
phase(2)
phase(1)
phase(3)
cnot(3,1)
phase(4)
phase(3)
phase(2)
hadamard(4)
hadamard(3)
hadamard(2)
hadamard(1)
cnot(3,1)
hadamard(4)
hadamard(4)
hadamard(2)
hadamard(1)
output(svec)

```

```
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' TeX output 2014.09.02:1717' -> temp.eps
</usr/local/texlive/2014/texmf-dist/dvips/base/tex.pro>
</usr/local/texlive/2014/texmf-dist/dvips/base/txeps.pro>.
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmr8.pfb>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmmi10.pfb>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmsy10.pfb>
[1]
WARNING: OSX reader: indexed color images not implemented
```

Quantum circuit diagram for the 4-qubit Shor's code. The circuit consists of 6 stages. Stage 1: CNOT from q_1 to q_2 , CNOT from q_1 to q_3 . Stage 2: P gate on q_1 , P gates on q_2 , q_3 , and q_4 . Stage 3: CNOT from q_2 to q_1 , CNOT from q_3 to q_1 . Stage 4: P gates on q_1 and q_2 , P gates on q_3 and q_4 . Stage 5: CNOT from q_1 to q_2 , CNOT from q_1 to q_3 . Stage 6: P gates on q_1 and q_2 , P gates on q_3 and q_4 . The final state is the encoded state.

```
: decompose(48,8) # create Clifford 48 of a 8 qubit system
drawCircuit() # show us what we have
```

Tableau for unitary:

```
+XIYIIIII
+IXIIIIII
+ZIZIIIII
+IIIXIIII
+IIIIXIII
+IIIIIXII
+IIIIIXXI
+IIIIIIIX
-----
+ZIIIIIII
+IZIIIIII
+ZIXIIIII
+IIIZIIII
+IIIIZIII
+IIIIIZII
+IIIIIIZI
+IIIIIIIZ
setup(8)
cnot(3,1)
phase(8)
phase(8)
phase(7)
phase(7)
phase(6)
phase(6)
phase(5)
phase(5)
phase(4)
phase(4)
phase(2)
phase(2)
phase(8)
phase(7)
phase(6)
phase(5)
phase(4)
phase(3)
phase(2)
phase(1)
phase(3)
cnot(3,1)
phase(8)
phase(7)
phase(6)
phase(5)
phase(4)
phase(3)
phase(2)
hadamard(8)
hadamard(7)
hadamard(6)
hadamard(5)
hadamard(4)
hadamard(3)
hadamard(2)
hadamard(1)
cnot(3,1)
hadamard(8)
hadamard(7)
hadamard(6)
hadamard(5)
hadamard(4)
hadamard(2)
hadamard(1)
output(svec)
```

```
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' TeX output 2014.09.02:1718' -> temp.eps
</usr/local/texlive/2014/texmf-dist/dvips/base/tex.pro>
</usr/local/texlive/2014/texmf-dist/dvips/base/texps.pro>.
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmr8.pfb>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmmi10.pfb>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmsy10.pfb>
[1]
WARNING: OSX reader: indexed color images not implemented
```

```

setup(18)
cnot(8,7)
cnot(7,6)
cnot(7,4)
cnot(7,1)
cnot(6,4)
cnot(6,1)
phase(18)
phase(18)
phase(17)
phase(17)
phase(16)
phase(16)
phase(15)
phase(15)

```

phase(14)
phase(14)
phase(13)
phase(13)
phase(12)
phase(12)
phase(11)
phase(11)
phase(10)
phase(10)
phase(9)
phase(9)
phase(6)
phase(6)
phase(5)
phase(5)
phase(3)
phase(3)
phase(2)
phase(2)
phase(1)
phase(1)
phase(18)
phase(17)
phase(16)
phase(15)
phase(14)
phase(13)
phase(12)
phase(11)
phase(10)
phase(9)
phase(8)
phase(7)
phase(6)
phase(5)
phase(4)
phase(3)
phase(2)
phase(1)
cnot(8,7)
phase(7)
cnot(8,6)
cnot(7,6)
cnot(6,4)
cnot(6,1)
phase(18)
phase(17)
phase(16)
phase(15)
phase(14)
phase(13)
phase(12)
phase(11)
phase(10)
phase(9)
phase(8)
phase(7)
phase(5)
phase(4)
phase(3)
phase(2)
hadamard(18)
hadamard(17)
hadamard(16)
hadamard(15)
hadamard(14)
hadamard(13)
hadamard(12)
hadamard(11)
hadamard(10)
hadamard(9)
hadamard(8)
hadamard(7)
hadamard(6)
hadamard(5)
hadamard(4)
hadamard(3)
hadamard(2)
hadamard(1)
phase(18)
phase(18)
phase(17)
phase(17)
phase(16)
phase(16)

phase(15)
phase(15)
phase(14)
phase(14)
phase(13)
phase(13)
phase(12)
phase(12)
phase(11)
phase(11)
phase(10)
phase(10)
phase(9)
phase(9)
phase(8)
phase(8)
phase(7)
phase(7)
phase(6)
phase(6)
phase(5)
phase(5)
phase(4)
phase(4)
phase(2)
phase(2)
phase(1)
phase(1)
phase(18)
phase(17)
phase(16)
phase(15)
phase(14)
phase(13)
phase(12)
phase(11)
phase(10)
phase(9)
phase(8)
phase(7)
phase(6)
phase(5)
phase(4)
phase(3)
phase(2)
phase(1)
phase(18)
phase(17)
phase(16)
phase(15)
phase(14)
phase(13)
phase(12)
phase(11)
phase(10)
phase(9)
phase(8)
phase(7)
phase(5)
phase(4)
phase(2)
phase(1)
cnot(6,8)
cnot(6,7)
cnot(6,4)
cnot(6,1)
cnot(3,8)
cnot(3,7)
cnot(3,6)
cnot(3,4)
cnot(3,1)
hadamard(18)
hadamard(17)
hadamard(16)
hadamard(15)
hadamard(14)
hadamard(13)
hadamard(12)
hadamard(11)
hadamard(10)
hadamard(9)
hadamard(8)
hadamard(7)
hadamard(5)
hadamard(4)
hadamard(3)


```
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</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmmi10.pfb>
</usr/local/texlive/2014/texmf-dist/fonts/type1/public/amsfonts/cm/cmsy10.pfb>
[1]
WARNING: OSX reader: indexed color images not implemented
```

In []: