```
library(dplyr)
```

```
##
## Attaching package: 'dplyr'
```

```
## The following objects are masked from 'package:stats':
##
##     filter, lag
```

```
## The following objects are masked from 'package:base':
##
##     intersect, setdiff, setequal, union
```

```
library(abind)

# note these need to be divisible by 3 and 2, given the setup
nc <- 12
nr <- 12
colours <- c("white", "red", "orange", "blue", "green")
```

Vectors of the thread 'colours' - 0s for 'missing'

```
warp <- c(0:2)
weft <- c(0, 3:4)
```

Make into a matrix of the whole

```
warp_threads <- matrix(warp, nr, nc, byrow = TRUE)
weft_threads <- matrix(weft, nr, nc)
```

Now stack the warp and the weft threads in a 3D array. `abind::abind` is a convenience here.

```
loom <- abind(list(warp_threads, weft_threads), along = 3)
```

Make a classic basic weave over-under matrix. Note 1 and 2 because or R indexing. 1 = warp, 2 = weft.

```
# use a function for convenience
basic_weave <- function(nrows = nr, ncols = nc) {
  c1 <- rep(1:2, nr / 2)
  c2 <- 3 - c1
  return(matrix(c(c1, c2), nrow = nrows, ncol = ncols))
}

# and make the matrix
warp_or_weft <- basic_weave()
```

Now make changes due to missing threads. Note that we only need to make changes where there is a single thread missing. Where both are missing the selection step will pick a 0 anyway.

```
warp_or_weft[which(warp_threads == 0)] = 2
warp_or_weft[which(weft_threads == 0)] = 1
```

For indexing we need this, because `, ,` doesn't seem to work for this.

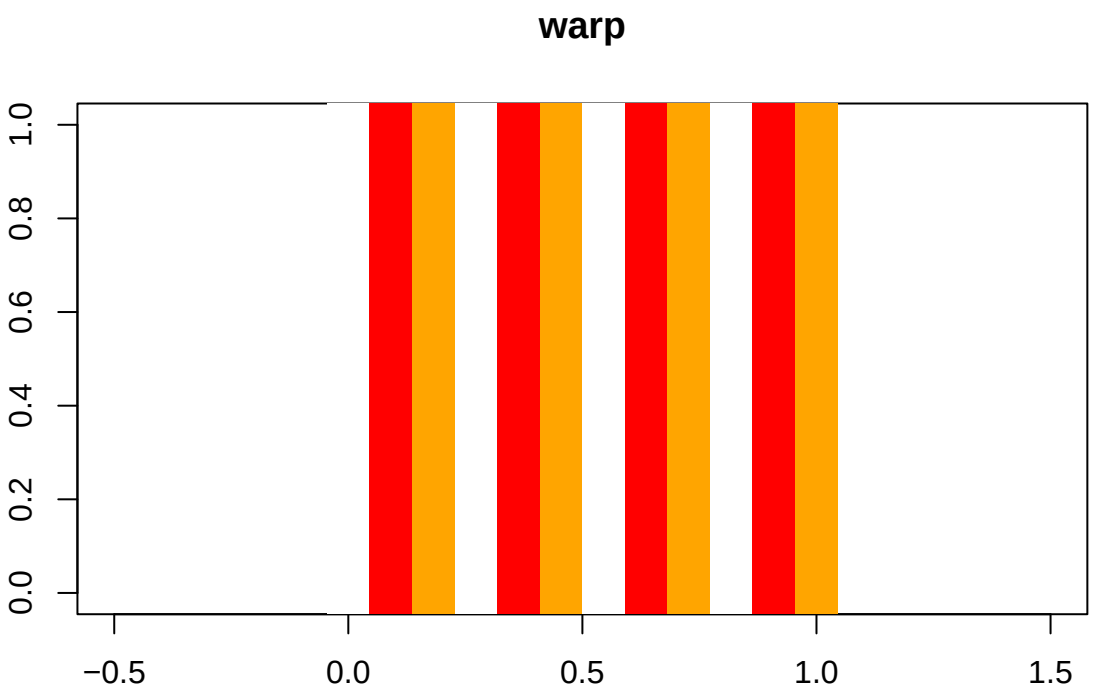
```
rc_indexes <- expand.grid(1:nr, 1:nc)
```

And now we can generate the cloth by indexing into the `loom` stack using `warp_or_weft`

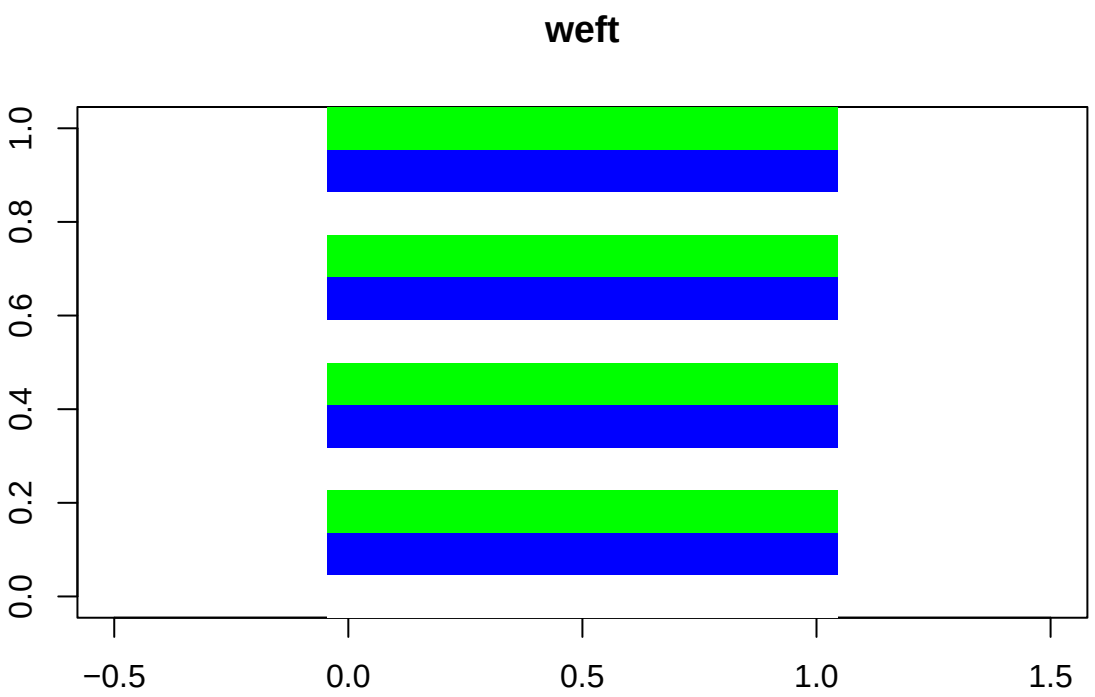
```
cloth <- loom[cbind(rc_indexes[, 1], rc_indexes[, 2], c(warp_or_weft))] %>%
  matrix(nrow(warp_or_weft), ncol(warp_or_weft))
```

Plots to confirm

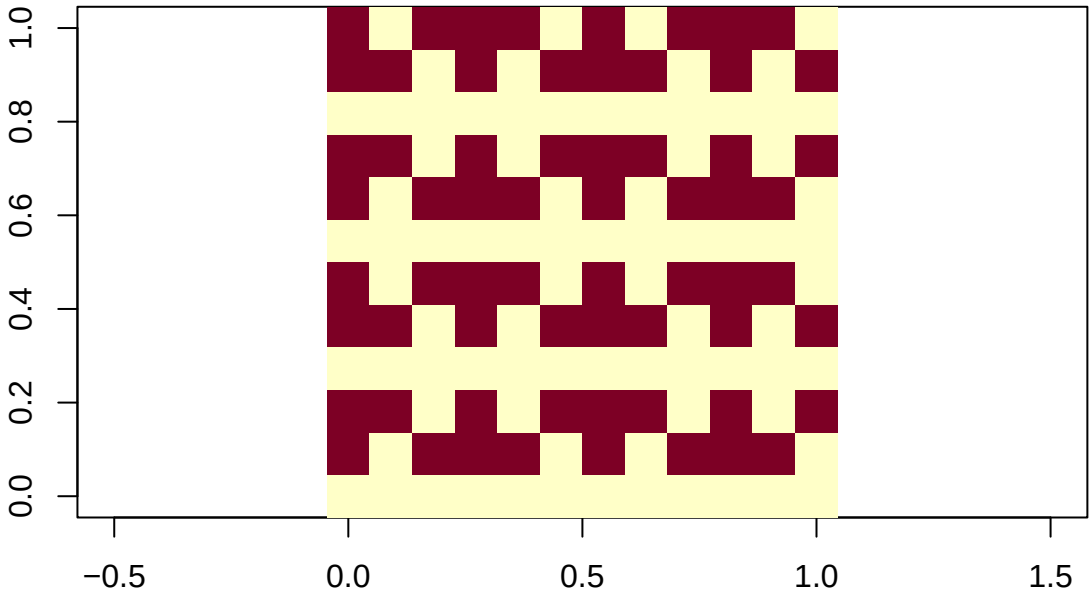
```
image(t(warp_threads), main = "warp", col = colours, breaks = 0:5 - 0.5, asp = 1)
```




```
image(t(weft_threads), main = "weft", col = colours, breaks = 0:5 - 0.5, asp = 1)
```




```
image(t(warp_or_weft), main = "weave pattern", asp = 1)
```




```
image(t(cloth), main = "colour pattern", col = colours, breaks = 0:5 - 0.5, asp = 1)
```