#############################################################

#

# Sim fish movement

#

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# A B C D E F G H I J K L

StrMean1 <- c( 0, 10, 15, 17, 19, 13, 14, 11, 9, 7, 17, 19 )

StrSD1 <- c( 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1 )/2

# A B C D E F G H I J K L

Dist1 <- matrix( c(0, 10, 20, 23, 28, 22, 29, 15, 16, 20, 18, 23, #A

0, 0, 10, 13, 18, 12, 19, 5, 6, 10, 8, 13, #B

0, 0, 0, 3, 8, 2, 9, 15, 16, 20, 18, 23, #C

0, 0, 0, 0, 5, 5, 12, 18, 19, 23, 21, 26, #D

0, 0, 0, 0, 0, 10, 17, 23, 24, 28, 26, 31, #E

0, 0, 0, 0, 0, 0, 7, 17, 18, 22, 20, 25, #F

0, 0, 0, 0, 0, 0, 0, 24, 25, 29, 27, 32, #G

0, 0, 0, 0, 0, 0, 0, 0, 1, 5, 3, 8, #H

0, 0, 0, 0, 0, 0, 0, 0, 0, 4, 4, 9, #I

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 8, 13, #J

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 5, #K

0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0, 0 ),#L

ncol = 12, nrow = 12 )

# Put them together

Dist2 <- Dist1 + t(Dist1)

# Time length

t1 <- 100

path1 <- rep( 0, t1)

raw1 <- rep( 0, t1 )

# Fish Move distance

fmd1 <- 1

# Start State

loc1 <- sample( 1:12, 1, replace = FALSE )

path1[1] <- loc1

raw1[1] <- rnorm( 1, StrMean1[loc1], StrSD1[loc1])

#Keep updating the location based on probabilities

for( i in 2:t1){

ProbChange1 <- exp( -1/fmd1\*Dist2[loc1,])

loc1 <- sample( 1:12, 1, prob = ProbChange1 )

path1[i] <- loc1

raw1[i] <- rnorm( 1, StrMean1[loc1], StrSD1[loc1])

}

plot( 1:t1, raw1, type = "l" )

lines( 1:t1, StrMean1[path1], col = "red")