

## Final MATH 208 (Question 4)

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MATH 208 - Final

(A)

```
one_turn = function(init_hare, init_turt){
  hare_probs = c(0, 5)
  turt_probs = c(2, 4)

  init_hare = init_hare + sample(hare_probs, 1)
  init_turt = init_turt + sample(turt_probs, 1)

  return(c(init_hare, init_turt))
}

full_game = function(seed){
  set.seed(seed)
  hare_position = 0
  turtoise_position = 0
  hist = list()
  i = 1
  while(hare_position < 100 & turtoise_position < 100){
    updated_positions = one_turn(hare_position, turtoise_position)

    hist[i] = list(updated_positions)
    i = i + 1
    hare_position = updated_positions[[1]]
    turtoise_position = updated_positions[[2]]
  }
  if(hare_position >= 100){
    return(c(winner="Hare", tibble(History=hist)))
  }
  return(c(winner="Turtoise", tibble(History=hist)))
}
full_game(123)
```

```
## $winner
## [1] "Turtoise"
##
## $History
## $History[[1]]
## [1] 0 2
```

```

##
## $History[[2]]
## [1] 0 6
##
## $History[[3]]
## [1] 0 10
##
## $History[[4]]
## [1] 5 14
##
## $History[[5]]
## [1] 5 16
##
## $History[[6]]
## [1] 10 20
##
## $History[[7]]
## [1] 15 22
##
## $History[[8]]
## [1] 20 24
##
## $History[[9]]
## [1] 25 26
##
## $History[[10]]
## [1] 25 28
##
## $History[[11]]
## [1] 25 32
##
## $History[[12]]
## [1] 25 34
##
## $History[[13]]
## [1] 25 36
##
## $History[[14]]
## [1] 30 40
##
## $History[[15]]
## [1] 30 44
##
## $History[[16]]
## [1] 30 48
##
## $History[[17]]
## [1] 30 52
##
## $History[[18]]
## [1] 35 54
##
## $History[[19]]
## [1] 35 56

```

```
##
## $History[[20]]
## [1] 35 60
##
## $History[[21]]
## [1] 35 64
##
## $History[[22]]
## [1] 40 66
##
## $History[[23]]
## [1] 40 68
##
## $History[[24]]
## [1] 40 72
##
## $History[[25]]
## [1] 40 74
##
## $History[[26]]
## [1] 45 76
##
## $History[[27]]
## [1] 45 78
##
## $History[[28]]
## [1] 45 82
##
## $History[[29]]
## [1] 50 84
##
## $History[[30]]
## [1] 55 86
##
## $History[[31]]
## [1] 55 90
##
## $History[[32]]
## [1] 60 92
##
## $History[[33]]
## [1] 60 96
##
## $History[[34]]
## [1] 60 98
##
## $History[[35]]
## [1] 60 100
```