Year 2 Concurrent Computing GOL Appendix - TB1 2019

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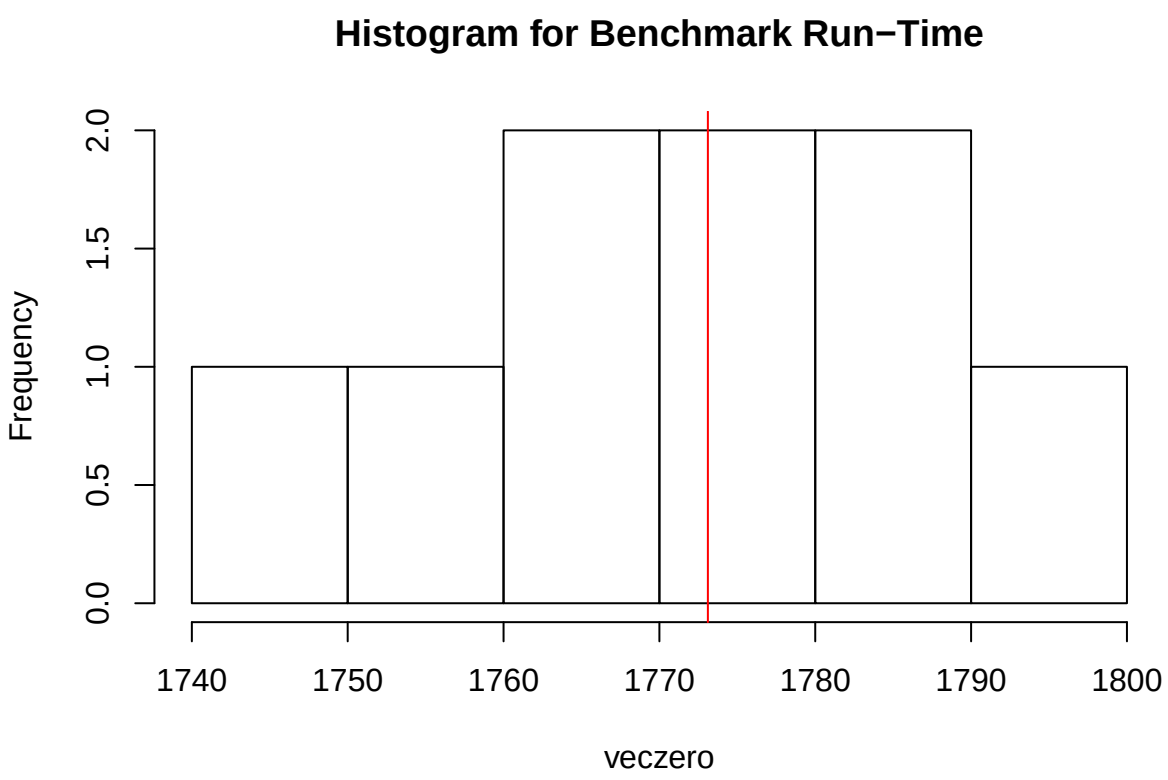
Note: All data collected is done using the command **make test** found in the provided makefile and as such represents an average run-time for all input sizes across a range of thread counts.

Version 1.0

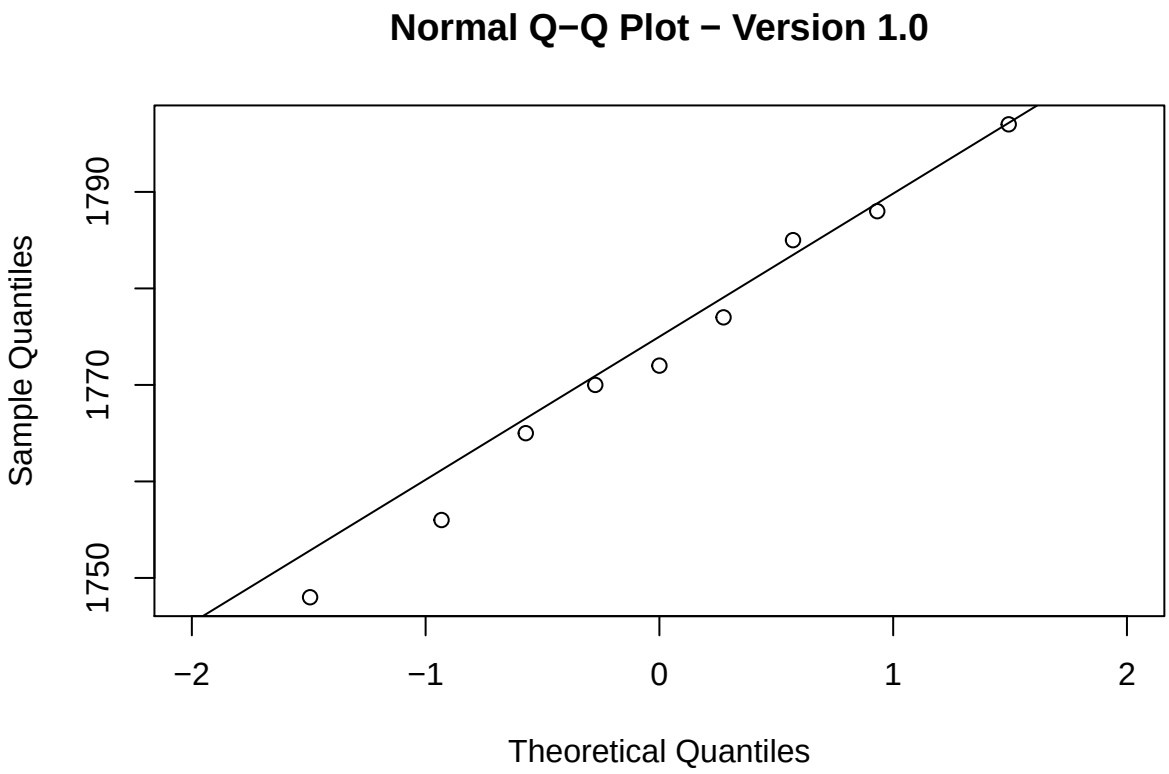
```
veczero = vector(length = 9)
veczero[0] = 1776
veczero[1] = 1765
veczero[2] = 1785
veczero[3] = 1772
veczero[4] = 1788
veczero[5] = 1756
veczero[6] = 1777
veczero[7] = 1797
veczero[8] = 1748
veczero[9] = 1770
sd(veczero)
```

```
## [1] 15.60805
```

```
hist(veczero, main = "Histogram for Benchmark Run-Time")
abline(v = mean(veczero), col = "red")
```




```
qqnorm(veczero, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.0")
qqline(veczero)
```

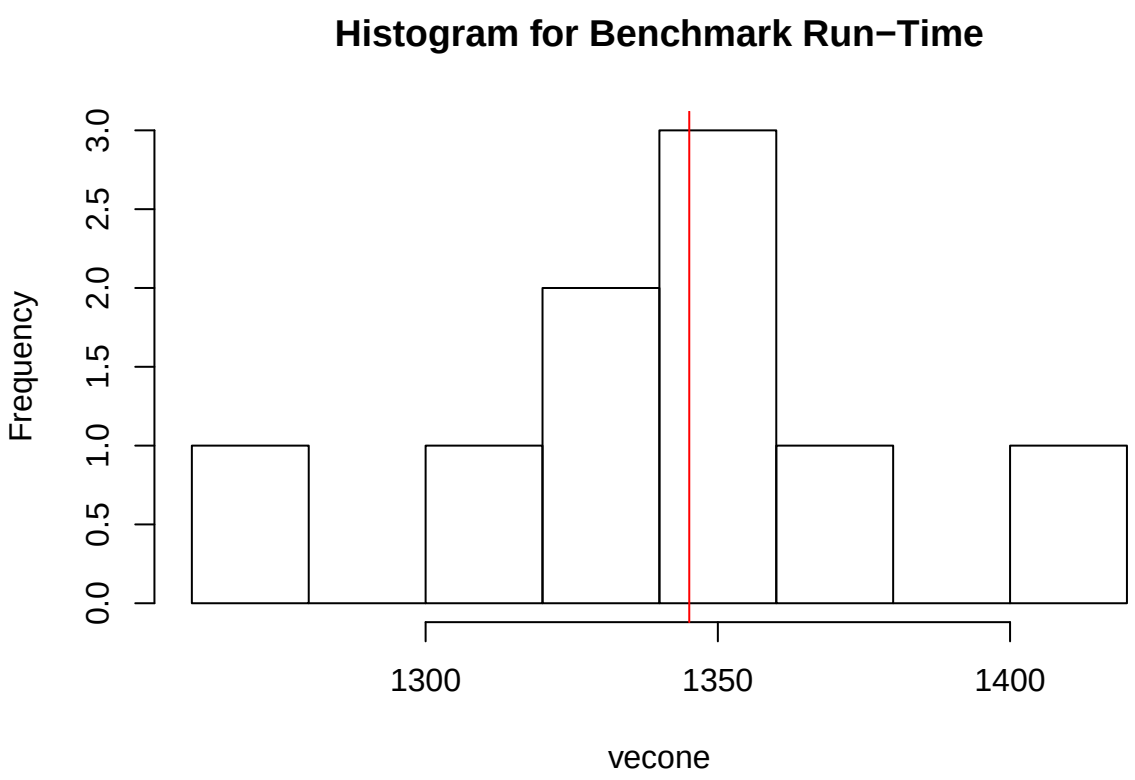


Version 1.1

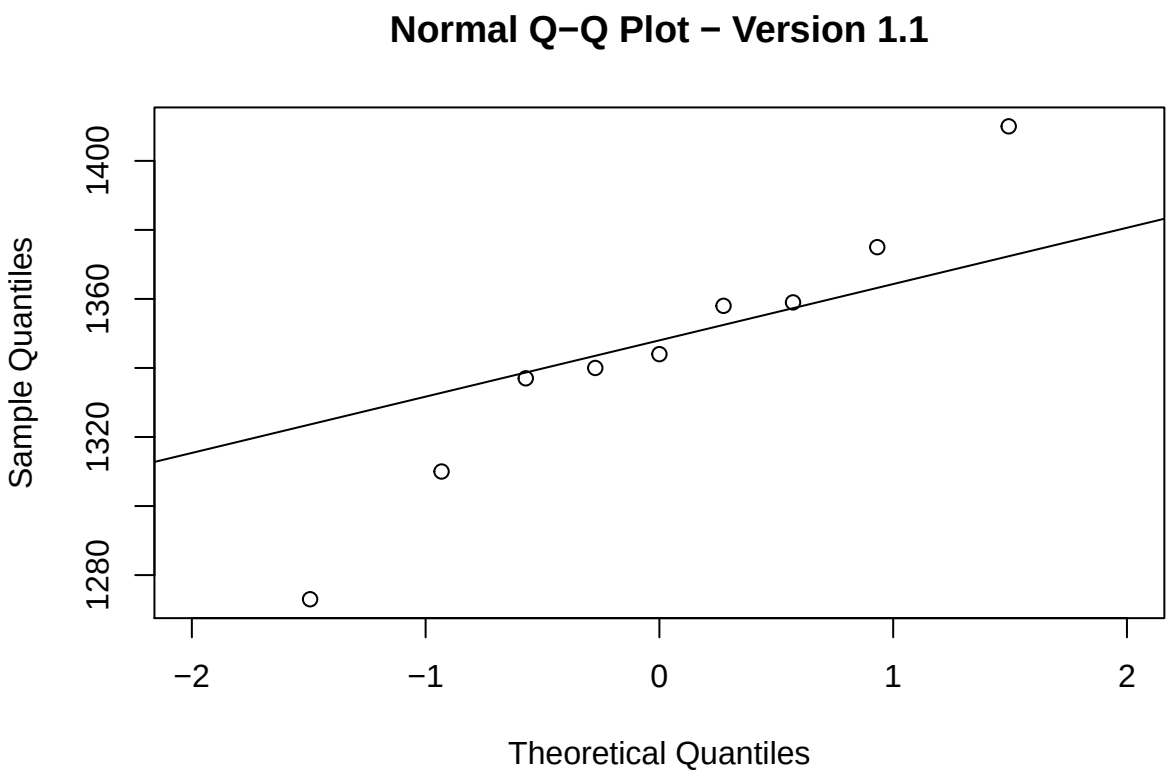
```
vecone = vector(length = 9)
vecone[0] = 1354
vecone[1] = 1359
vecone[2] = 1310
vecone[3] = 1358
vecone[4] = 1344
vecone[5] = 1410
vecone[6] = 1340
vecone[7] = 1273
vecone[8] = 1337
vecone[9] = 1375
sd(vecone)
```

```
## [1] 38.7119
```

```
hist(vecone, main = "Histogram for Benchmark Run-Time")
abline(v = mean(vecone), col = "red")
```




```
qqnorm(vecone, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.1")
qqline(vecone)
```

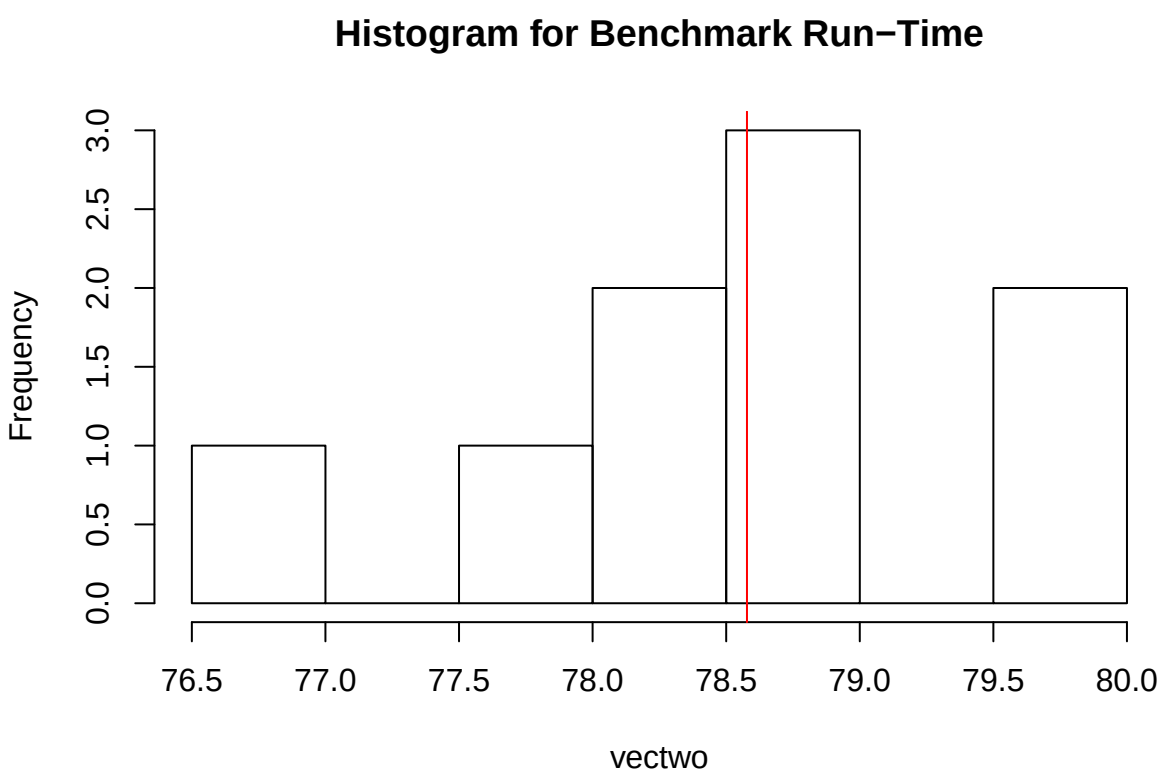


Version 1.4

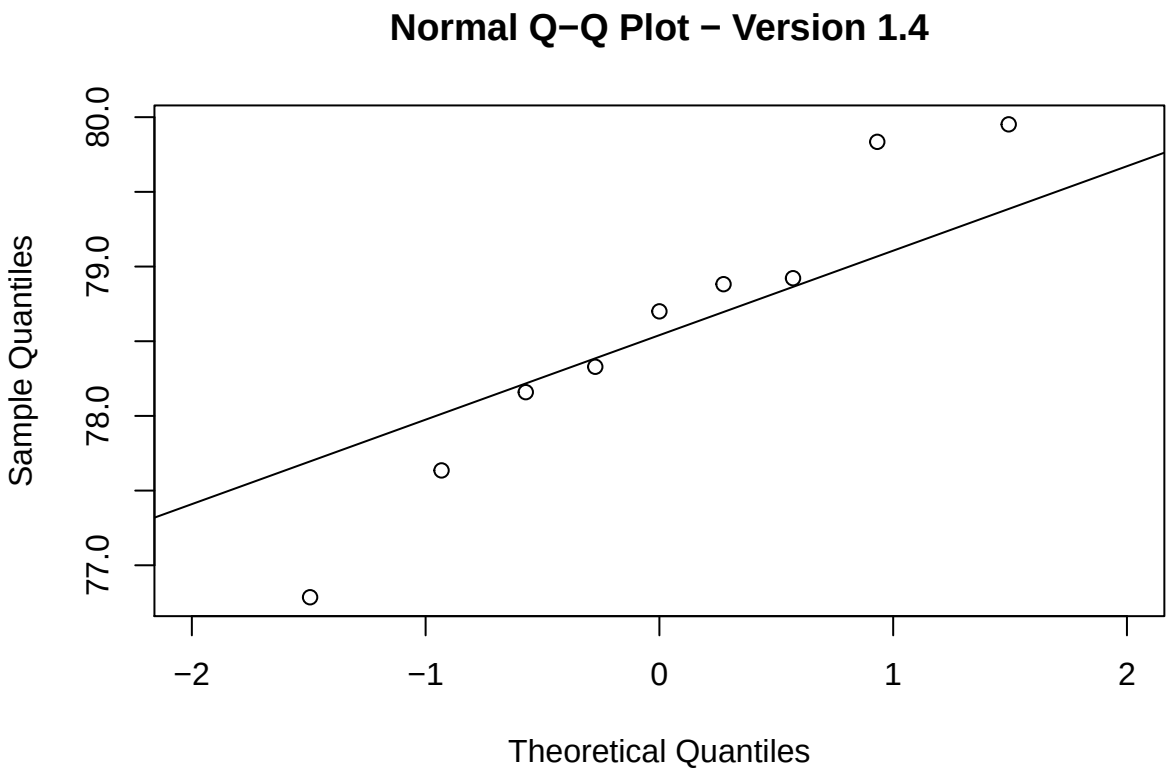
```
vectwo = vector(length = 9)
vectwo[0] = 78.172
vectwo[1] = 78.329
vectwo[2] = 76.786
vectwo[3] = 78.922
vectwo[4] = 79.835
vectwo[5] = 78.159
vectwo[6] = 78.882
vectwo[7] = 78.700
vectwo[8] = 79.952
vectwo[9] = 77.635
sd(vectwo)
```

```
## [1] 1.001975
```

```
hist(vectwo, main = "Histogram for Benchmark Run-Time")
abline(v = mean(vectwo), col = "red")
```




```
qqnorm(vectwo, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.4")
qqline(vectwo)
```

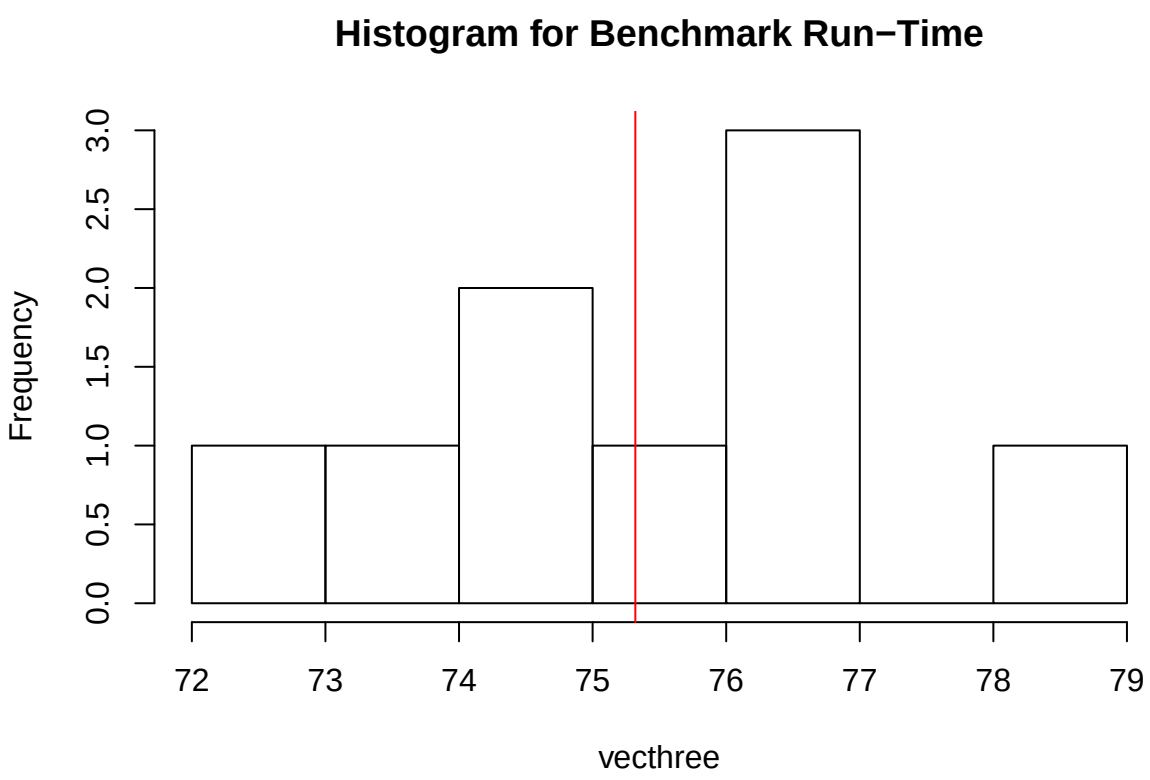


Version 1.4.5

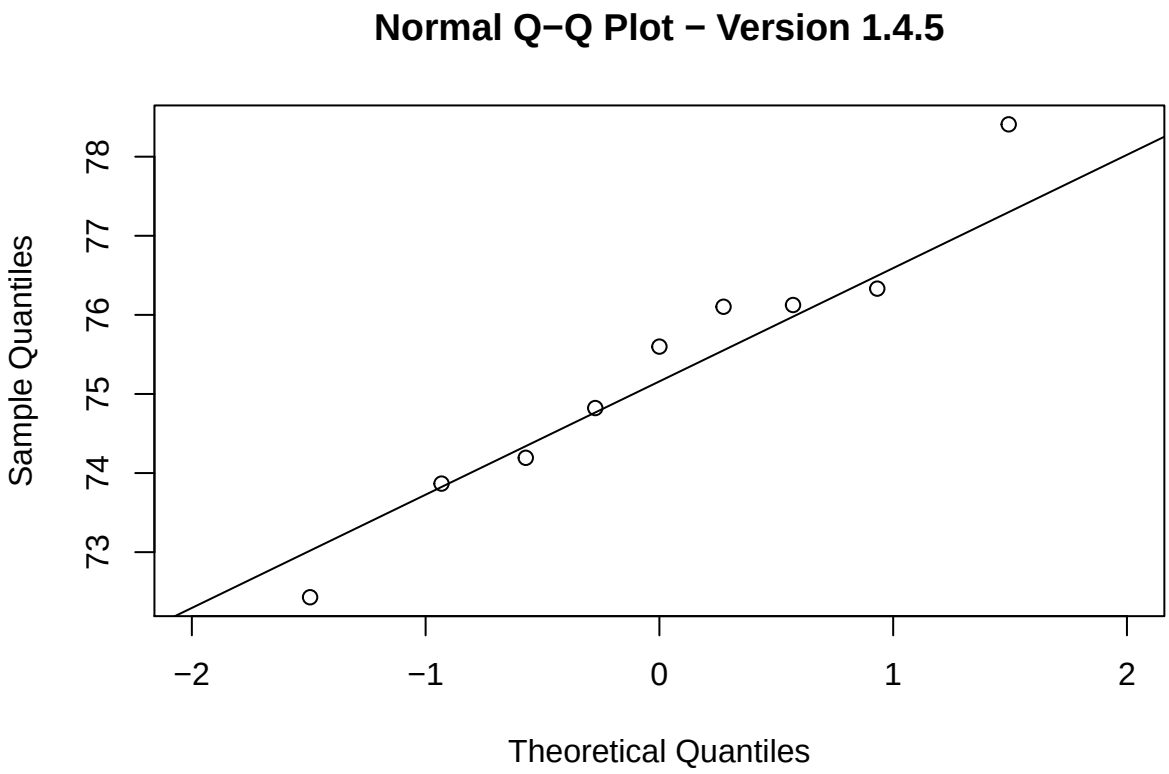
```
vecthree = vector(length = 9)
vecthree[0] = 79.575
vecthree[1] = 74.193
vecthree[2] = 76.103
vecthree[3] = 78.409
vecthree[4] = 75.599
vecthree[5] = 72.430
vecthree[6] = 74.822
vecthree[7] = 76.125
vecthree[8] = 73.867
vecthree[9] = 76.332
sd(vecthree)
```

```
## [1] 1.727949
```

```
hist(vecthree, main = "Histogram for Benchmark Run-Time")
abline(v = mean(vecthree), col = "red")
```




```
qqnorm(vecthree, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.4.5")
qqline(vecthree)
```

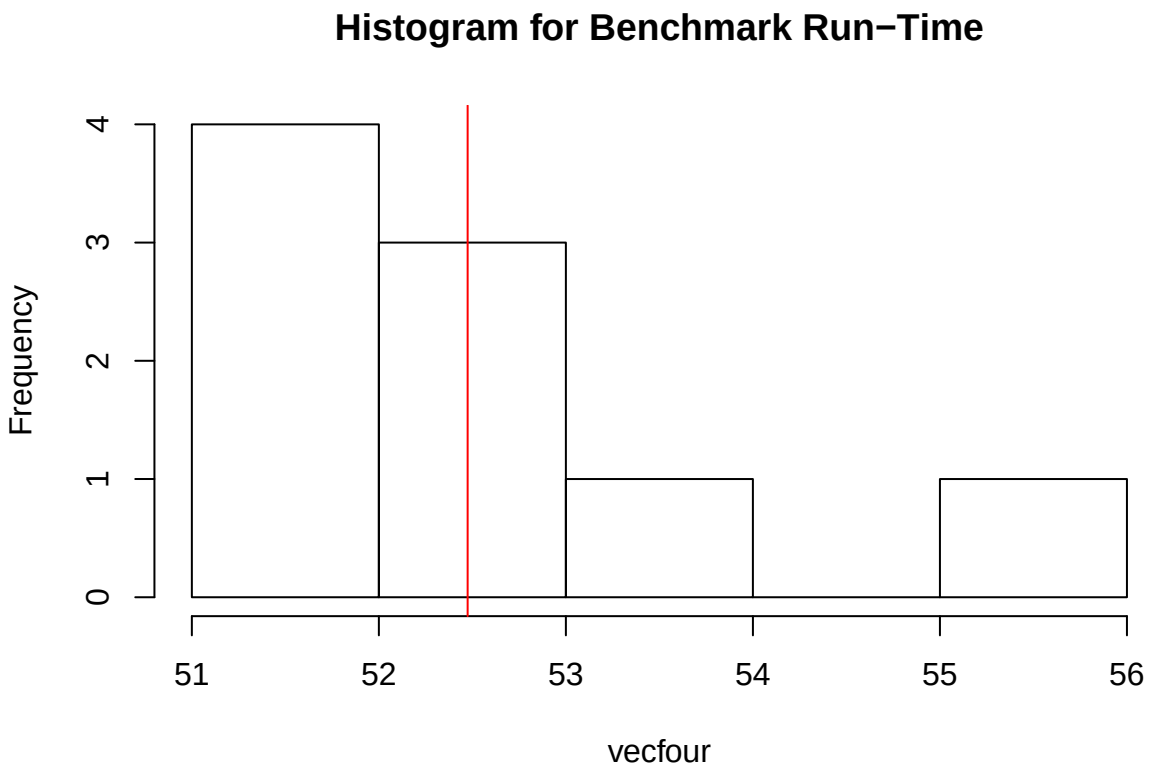


Version 1.6

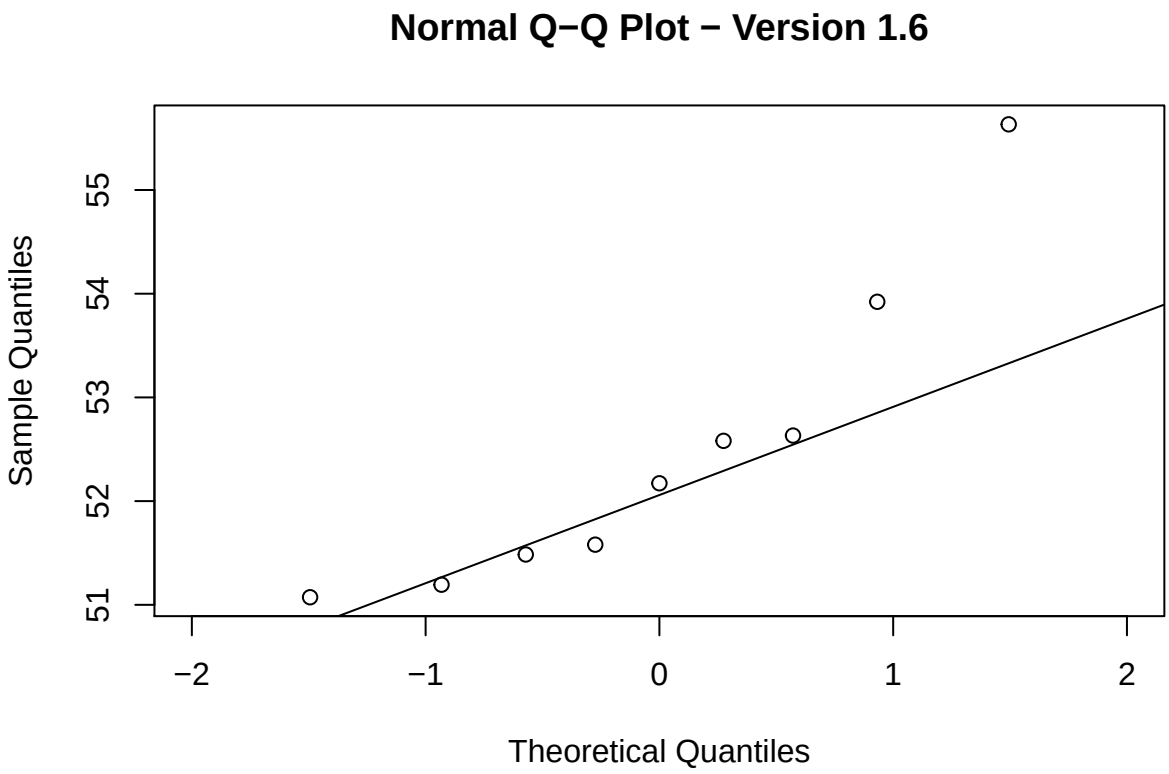
```
vecfour = vector(length = 9)
vecfour[0] = 53.009
vecfour[1] = 52.172
vecfour[2] = 55.633
vecfour[3] = 51.073
vecfour[4] = 51.580
vecfour[5] = 51.194
vecfour[6] = 51.485
vecfour[7] = 52.581
vecfour[8] = 53.922
vecfour[9] = 52.632
sd(vecfour)
```

```
## [1] 1.482488
```

```
hist(vecfour, main = "Histogram for Benchmark Run-Time")
abline(v = mean(vecfour), col = "red")
```




```
qqnorm(vecfour, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.6")
qqline(vecfour)
```

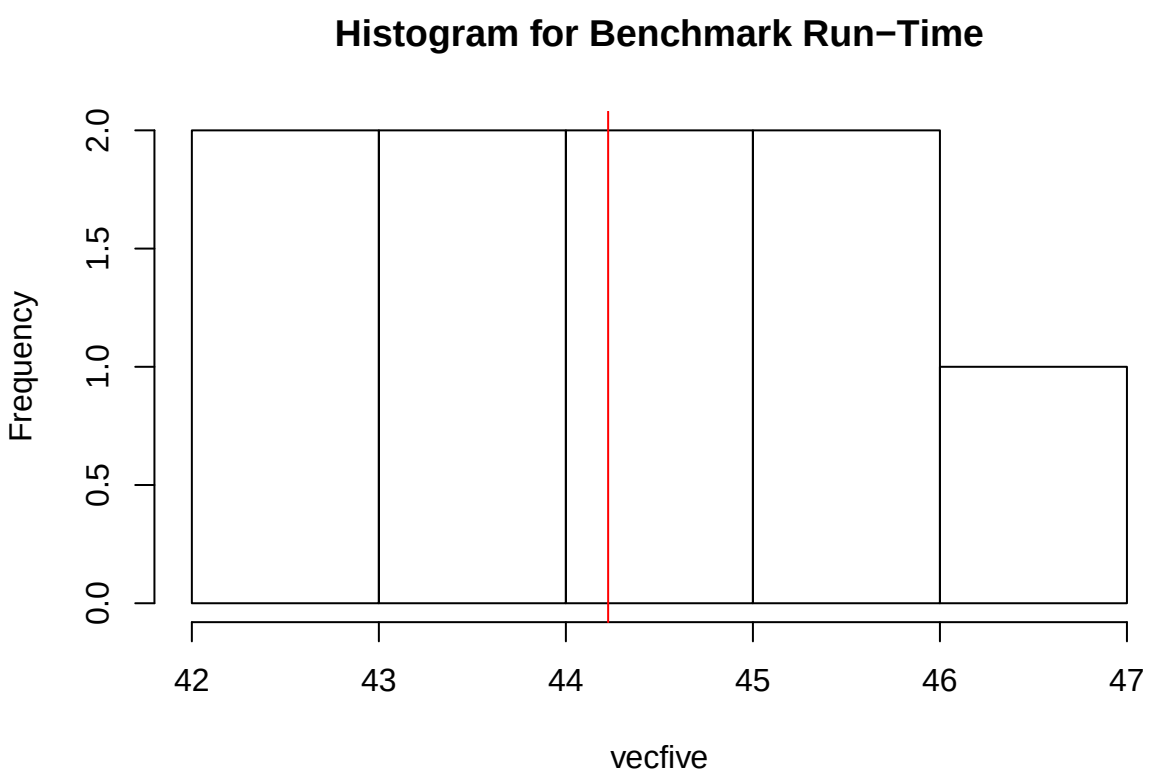


Version 1.6.5

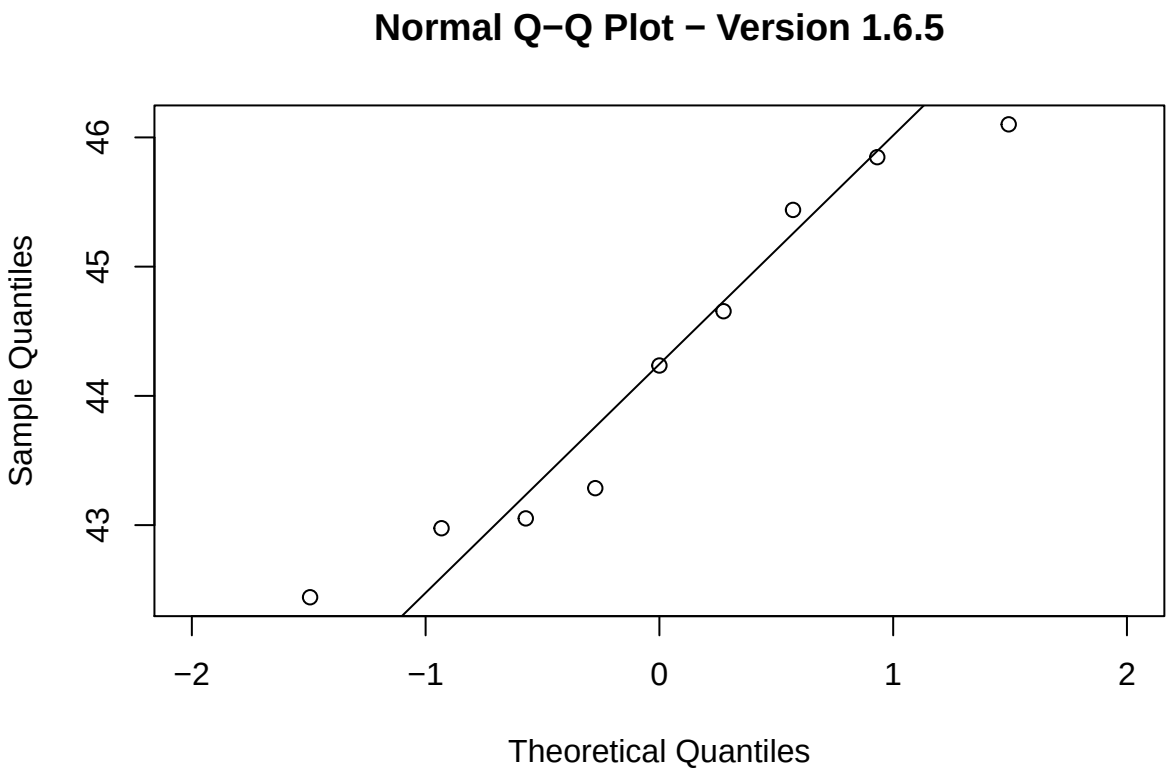
```
vecfive = vector(length = 9)
vecfive[0] = 47.262
vecfive[1] = 42.442
vecfive[2] = 43.052
vecfive[3] = 45.847
vecfive[4] = 42.976
vecfive[5] = 45.439
vecfive[6] = 43.286
vecfive[7] = 44.235
vecfive[8] = 44.655
vecfive[9] = 46.101
sd(vecfive)
```

```
## [1] 1.360413
```

```
hist(vecfive, main = "Histogram for Benchmark Run-Time")
abline(v = mean(vecfive), col = "red")
```




```
qqnorm(vecfive, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.6.5")
qqline(vecfive)
```

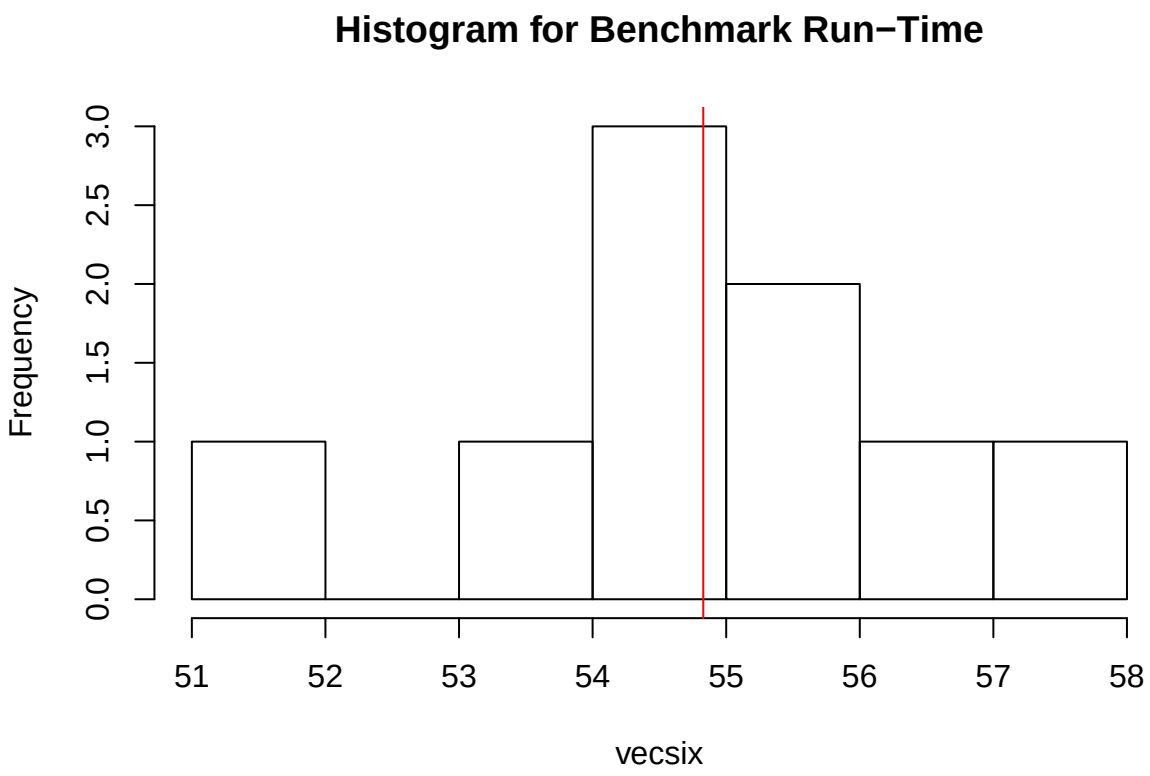


Version 1.7

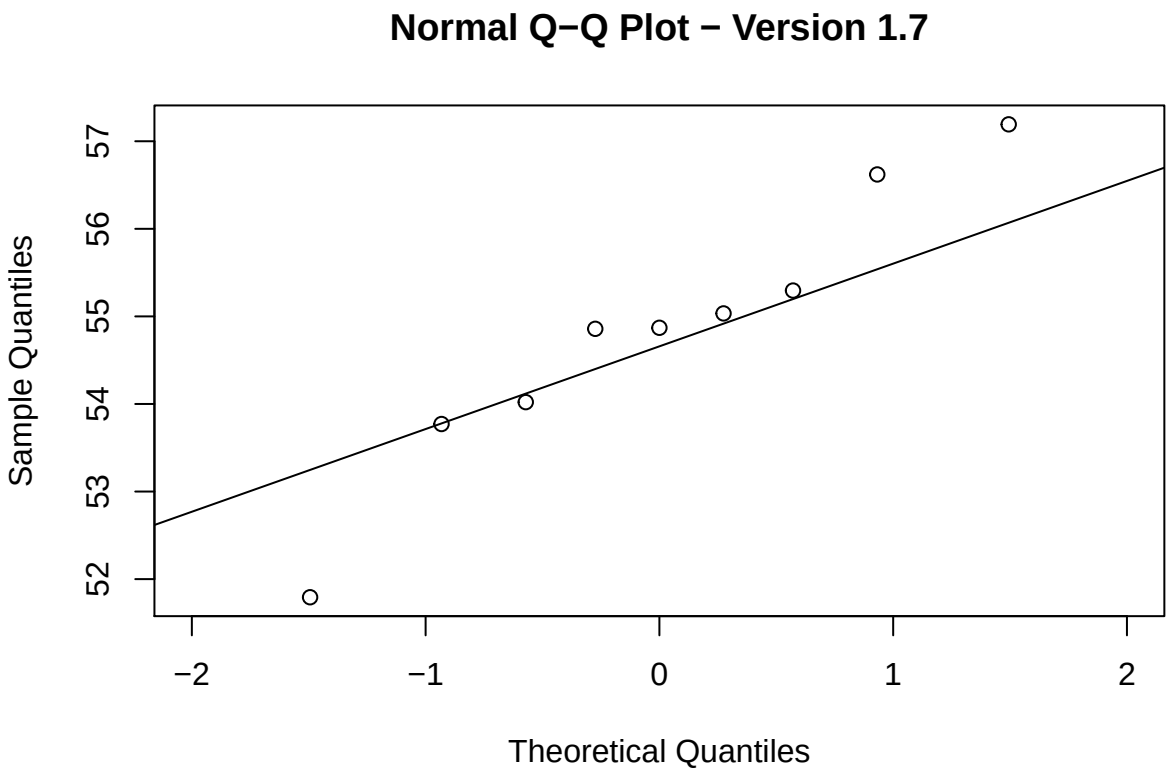
```
vecsix = vector(length = 9)
vecsix[0] = 56.854
vecsix[1] = 51.793
vecsix[2] = 56.621
vecsix[3] = 54.858
vecsix[4] = 57.193
vecsix[5] = 55.034
vecsix[6] = 54.021
vecsix[7] = 54.870
vecsix[8] = 55.295
vecsix[9] = 53.771
sd(vecsix)
```

```
## [1] 1.583153
```

```
hist(vecsix, main = "Histogram for Benchmark Run-Time")
abline(v = mean(vecsix), col = "red")
```




```
qqnorm(vecsix, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.7")
qqline(vecsix)
```

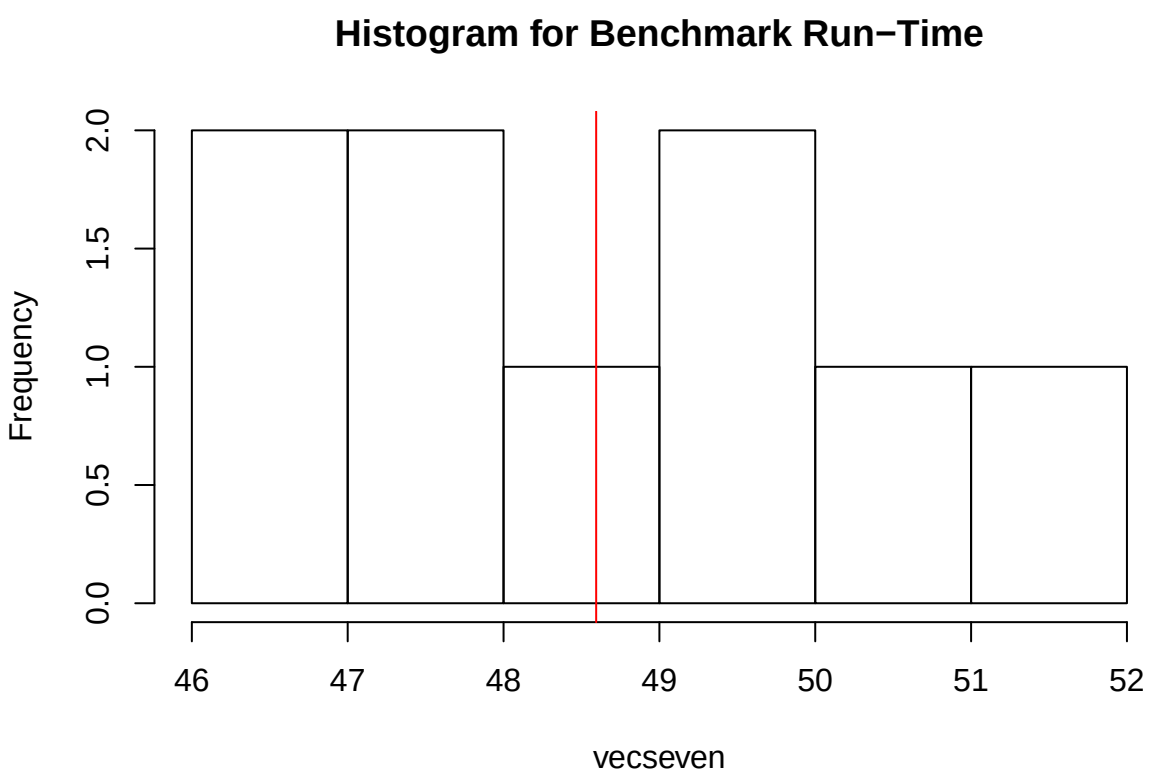


Version 1.7.5

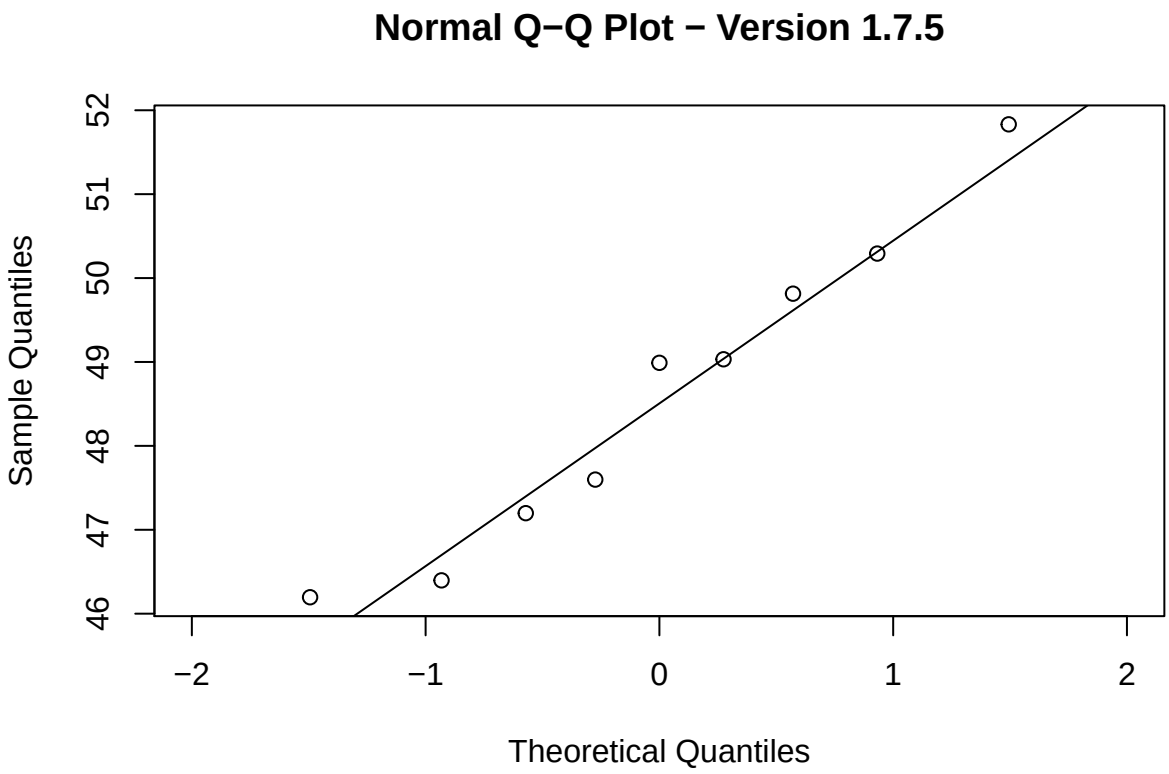
```
vecseven = vector(length = 9)
vecseven[0] = 46.759
vecseven[1] = 49.814
vecseven[2] = 49.032
vecseven[3] = 47.198
vecseven[4] = 47.598
vecseven[5] = 46.397
vecseven[6] = 51.832
vecseven[7] = 50.292
vecseven[8] = 48.990
vecseven[9] = 46.196
sd(vecseven)
```

```
## [1] 1.894827
```

```
hist(vecseven, main = "Histogram for Benchmark Run-Time")
abline(v = mean(vecseven), col = "red")
```




```
qqnorm(vecseven, xlim=c(-2,2), main = "Normal Q-Q Plot - Version 1.7.5")
qqline(vecseven)
```


Normal Q−Q Plot − Version 1.7.5
Sample Quantiles
46
47
48
49
50
51
52
−2
−1
0
1
2
Theoretical Quantiles