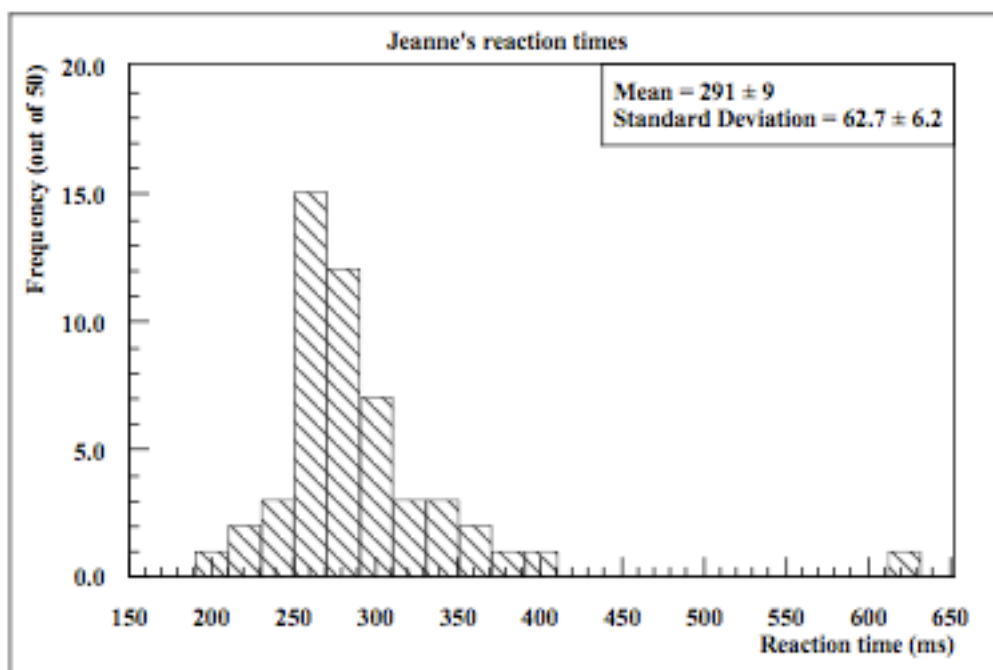


Homework 1 example solution and marking guide

Raw data: Table of reaction times in ms for 50 measurements, made at 2:30pm, Friday 10th September 2010 using the 'Reaction' program.

389	288	368	289	348
261	261	276	271	295
376	339	274	285	322
270	295	300	279	258
264	250	267	292	251
255	326	349	284	284
303	303	255	237	368
622	245	256	236	225
294	288	279	197	289
269	254	222	266	255

The data plotted in histogram format using PhysPlot



Mean: 291 ± 9 ms (evaluated by PhysPlot)

Standard Deviation = 62.7 ± 6.2 ms (evaluated by PhysPlot)

Variance = $\sigma^2 = 3931 \text{ ms}^2$

Median = 279 ms

Mode = 220 ms

Range = 622-197 = 425 ms

Chosen binning: 20 bins in range 150-650, bin width = 25ms

The histogram is not symmetric and slightly skewed to shorter reaction times (the median < mean, skew = mean-mode/ σ = 1.13) with some outliers at long reaction times, which can be attributed to a lapse in concentration. We would expect the distribution to be Gaussian in shape if a large number of measurements were taken and the method truly sampled just my reaction time. However, it was noted that it is possible to cheat – for example by holding the mouse button down and just releasing it when the lights change, or by trying to pre-empt the change since reactions before the change are not recorded. This could explain the skew to shorter reaction times.

Marking scheme out of a total of [20]

At least 50 data points [1]

Description of conditions in which data was taken [2]

Histogram

Suitable binning [1]

Axes labels [2]

Units for reaction time [1]

Plot title or figure caption [1]

Correct Mean and quoted correctly with units[2]

Correct Error on the Mean and quoted correctly with units [2]

Correct Standard Deviation and quoted correctly with units [2]

Correct Variance with units[1]

Correct Median [1]

Correct Mode [1]

Quoted result and sensible discussion [3]

