# Comparing Mathematica DataSets (2 columns) w/ R tidyverse' s dataframes (aka. tibbles)

## Machine : Windows10, I5 - 6500 2.7 Ghz, 4 - core, 16 Gb RAM

## 1) Creates 2-column datasets with 1, 10, ..., 10 million rows, reports total time elapsed and sizes. Returns in 22.125 seconds.

In[1]:=
```
makeDS[n_] := Dataset[Table[<|"random_real" → RandomReal[],
      "random_int" → RandomInteger[1000]|>, {n}]];
```

In[2]:=
```
Timing[mathSizes = Table[ByteCount[makeDS[10^n]], {n, 0, 7}]]
```

Out[2]=
```
{20.953125, {1184, 4784, 40 840, 400 944, 4 000 824, 40 000 824, 400 000 824, 4 000 000 824}}
```

## 2) Same functionality R 3.5.2, tidyverse 0.8.0 code : (returns in .62 seconds, 35x faster than mathematica)

```
library(tidyverse)
library(tictoc)
makeTibble ← function(n)
tibble(random_real=runif(n),random_integer=sample.int(1000,size=n,replace=T))
10^(0:5) %>% map_int(~object.size(makeTibble(.))%>%as.integer)
#> returns: 1016      1176      2200     13000    121000   1201000  12001000 120001000
#> 0.62 sec elapsed
```

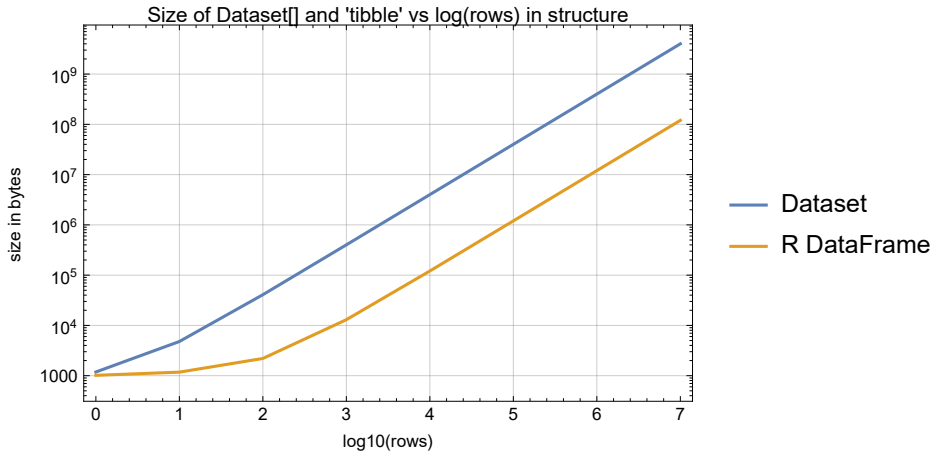
In[3]:=
```
rSizes = {1016, 1176, 2200, 13 000, 121 000, 1 201 000, 12 001 000, 120 001 000};
```

# Comparing sizes: Datasets ~ 33x bigger than tibbles

In[4]:=
```
InsertXs[l_] := Module[{xs},
    xs = Array[# &, Length[l]] - 1;
    MapThread[{#1, #2} &, {xs, l}]];
InsertXsLog[l_] := Module[{xs},
  xs = Array[# &, Length[l]] - 1;
  MapThread[{#1, Log[#2, 10]} &, {xs, l}]]
```

In[6]:=
```
ListLogPlot[{InsertXs[mathSizes], InsertXs[rSizes]},
 Joined → True,
 PlotLegends → {"Dataset", "R DataFrame"},
 Frame → True, GridLines → Automatic,
 PlotLabel → "Size of Dataset[] and 'tibble' vs log(rows) in structure",
 FrameLabel → {"log10(rows)", "size in bytes"}]
```

Out[6]=



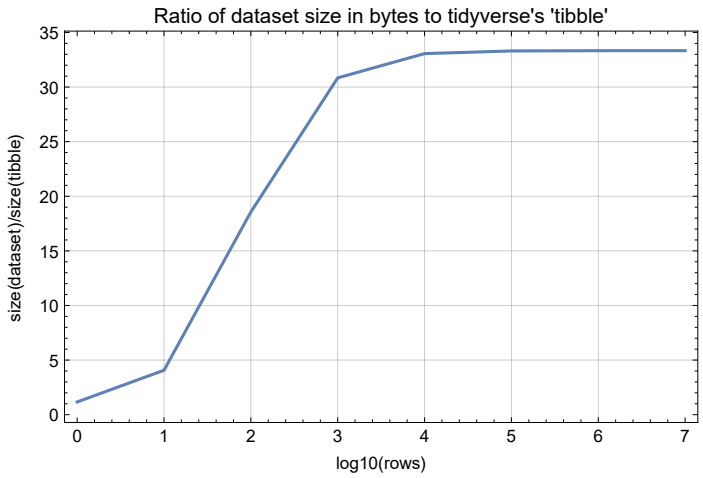

# Compare Size Ratios: w/ two columns, math dataset => 33x bigger

In[7]:=
```
sizeRatios = MapThread[N[#1 / #2] &, {mathSizes, rSizes}]
```

Out[7]=
```
{1.16535, 4.06803, 18.5636, 30.8418, 33.0647, 33.3063, 33.3306, 33.3331}
```

In[8]:=
```
ListPlot[InsertXs[sizeRatios],
 Frame → True, GridLines → Automatic, Joined → True,
 PlotLabel → "Ratio of dataset size in bytes to tidyverse's 'tibble'",
 FrameLabel → {"log10(rows)", "size(dataset)/size(tibble)"}]
```

Out[8]=




Note: if table has more columns, ratio will increase even more since column names are repeated in Associations.

Propose Wolfram creates DatasetColumnar[] and make all graphical and statistic functions talk directly with it (without the need to “peel” its internal contents)