Before you start: check how many **datasets** are there

- 1 dataset: normally 1 sample t-test
- 2 datasets: 2 sample tests

Topic 6 - 1-sample t-tests

Steps

1. Choose level of significance (α) → normally 0.05
2. Write null & alternate hypotheses
   $H_0 : \mu = 110$
   $H_1 : \mu \neq 110$
3. Check assumptions:
   H0: normal
   H1: not normal
   setwd("...")
   Data<-read.csv("xxx.csv")
   head(Data)
   qqnorm(Data$xxx) # normal plot → graph
   shapiro.test(Data$xxx) # formal test → data
4. Calculate test statistic
   t.test(Data$xxx,mu=yy)
5. Obtain P-value or critical value
6. Make statistical conclusion
7. Write a scientific (biological) conclusion

Before start checking the assumption:

median(Data$...)
mean(Data$...)
Library(momenta)
skewness(Data$...) → the mean & median are similar, the skewness is close to 0 ⇒ the data is likely to be normal

→ examine data to ensure imported properly
→ Check if the q-q plot is **linear or not**
→ If the p-value is **>0.05** → fail to reject the null hypothesis ⇒ the data is **normal**
→ **p-value < 0.05 → reject Null**
→ **p-value > 0.05 → fail to reject Null**

Example
A farmer has a novel way to fatten his pigs to bacon weight and wishes to see how it compares to the district average of 110 days.
mu=110

```
Bacon<-c(105, 112, 99, 97, 104, 107) #Data Input
t.test(Bacon,mu=110)

Output
One Sample t-test

#data:  Bacon
t = -2.7014, df = 5, p-value = 0.04272
alternative hypothesis: true mean is not equal to 110
95 percent confidence interval:
  98.29045 109.70955
sample estimates:
mean of x
      104
```

H0: $\mu = 110$
H1: $\mu \neq 110$

Interpret this output (in R type: help(t.test) to read more about the function)

t=-2.7014 < 0.05
→ reject the null hypothesis
$H_0 : \mu = 110$
$H_1 : \mu \neq 110$

E.g.

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It is believed that microbasins (tied ridging) can increase crop yield by concentrating runoff around the rootzone of the crop. However, tied ridging requires more effort on behalf of the farmer than traditional tillage. The provided data is from experiments conducted in Ethiopia. Maize was planted into equally sized tied ridge plots and the crop yield was measured (kg/hectare) at the end of the growing season. You are interested in finding out whether the yield of the tied ridge plot is significantly different than that of the traditional Maize yield which is 2600kg/hectare for this area. Use your statistical genius and R to answer the following questions:

□□□