STAT383 HW 4
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$H_0 : \mu_0 = 130$

$H_A : \mu_0 \neq 130$

```
import numpy
import scipy.stats as stats

hardness = numpy.asarray([135, 149, 132, 142, 124,
                          130, 122, 128, 120, 128,
                          127, 123, 136, 141, 130,
                          139, 134, 135, 130, 141,
                          149, 137, 137, 140, 148])

minimalHardness = 130
n = len(hardness)
confidence = 0.95
interval = stats.t(df=n, loc=hardness.mean(), scale=stats.sem(hardness)).interval(confidence)
print(f"{confidence*100}\% C.I. for \mu: {list(numpy.round(interval, 2))}")
```

95.0% C.I. for μ : $[130.89, 137.67]$
Since H_0 is not inside this interval, we reject H_0. Thus, the annealing process does not result in the proper Brinell hardness on average.

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$H_0 : \mu = 100$

$H_A : \mu \neq 100$

```
import numpy
import scipy.stats as stats

mean = 100
std = 15
n = 20
confidence = 0.95

interval = stats.t(df=n, loc=mean, scale=std/numpy.sqrt(n)).interval(confidence)
print(f"{confidence*100}\% C.I. for \mu: {list(numpy.round(interval, 2))}")
```

95.0% C.I. for μ : $[93.0, 107.0]$
Since H_0 is inside this interval, we fail to reject H_0. There is not enough evidence to suggest that students with behavioral issues have a different cognition from their peers.