Week 14

Recap for Final

Practice #1

Assume the data have different degree of freedom values as 5, 50, 500 and 5000

a) Construct 0.975 quantile for the given degree of freedom values

b) Construct cumulative probabilities for the given degree of freedom values

Solution #1

```python
import numpy as np
df = np.array([5, 50, 500, 5000])
from scipy.stats import t

## construct 0.975 quantile
print(t.ppf(0.975, df))

## construct cumulative probabilities
print(t.cdf(1.96043855, df))
```

Practice #2

The doctor would like to analyze weight changes of anorexia girls who are undergoing a cognitive behavioral therapy. Use anorexia.dat to solve each problem

a) Construct 95% confidence interval for the Bayesian population mean change on the first therapy

b) Construct 99% confidence interval for the Bayesian population mean change on the third therapy

Solution #2A

```python
import numpy as np
import pandas as pd
from scipy.stats import t

Anor = pd.read_csv(r"C:\Users\iamte\Downloads\Anorexia.dat", sep = '\s+')
diff =  Anor['after'] - Anor['before']
Anor['diff'] = diff
first = Anor.loc[Anor['therapy'] == 'cb']['diff']
m1 = first.mean(); n1 = len(first); s1 = first.std()
first_posterior = t(loc = m1, scale = s1/np.sqrt(n1), df = n1-1)
first_posterior.interval(0.95)
```

Solution #2B

```python
import numpy as np
import pandas as pd
from scipy.stats import t

Anor = pd.read_csv(r"C:\Users\iamte\Downloads\Anorexia.dat", sep = '\s+')
diff =  Anor['after'] - Anor['before']
Anor['diff'] = diff
third = Anor.loc[Anor['therapy'] == 'c']['diff']
m3 = third.mean(); n3 = len(third); s3 = third.std()
third_posterior = t(loc = m3, scale = s3/np.sqrt(n3), df = n3-1)
third_posterior.interval(0.99)
```