Hero Vired | A HERO GROUP COMPANY

Probability Basics - Session 2

Practice Exercise Solutions

1. The mean outcome for this game is calculated as follows: μ = (-1*.3) + (0*.4) + (3*.2) + (10*0.1) = -0.3 + 0.6 + 0.5 = 0.8

   the player can expect to win about 80 cents playing this game.

2. Expected Value: μ = E(X) = ∑x * P(x)
   = 4 × 0.32 + 5 × 0.47 = 3.63.
   Variance: $\sum x^2 * P(x)$: $\sum x^2 * P(x)$ = 16 × 0.32 + 25 × 0.47 = 16.87.
   Therefore, $Var(X) = \sum x^2 P(x) - \mu^2$ = 16.87 − 13.17 = 3.7.

3. Here the events are Loss, Break Even, and Profit with respective $ values. Thus, this is a discrete case.
   Compute the Expected Return for Project A (in case of loss the amount will be -ve)

   Project A: -71000 * 0.2 + 0* 0.65 + 0.15*143000 = $7250
4. Divide the data in the infants who survived and those who did not and compare the mean weight of the both groups.
   Survived: 23 and Not Survived: 27
   E[Survived] = 1.130 +1.575+ . . . +3.005 /23 = 2.307 kg
   E[NotSurvived] = 1.050 +1.175 + . . +2.730 / 27 = 1.692 kg

5.

a) # get cumulative probability for values

```
for i in range(int(df['Spending Score (1-100)'].min()),int(df['Spending Score (1-
100)'].max())+10, 10):
  print('P(x< %s): %.3f'%(i, ecdf(i)))
```

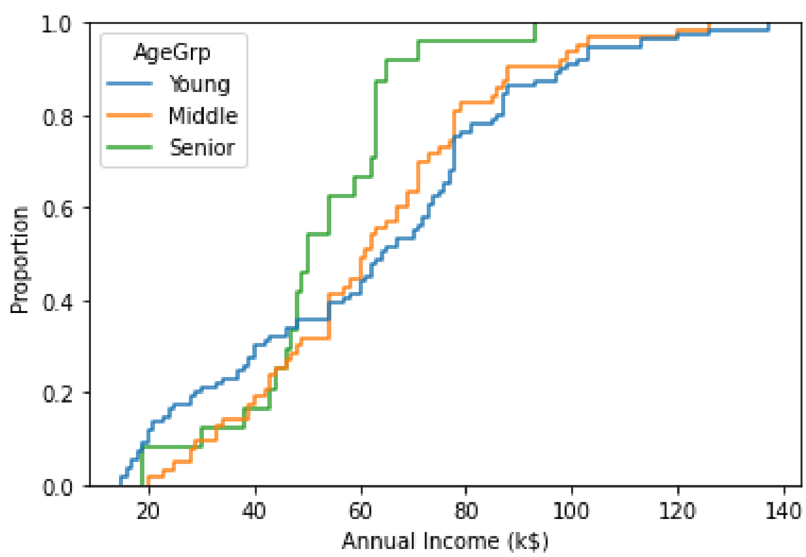
```
P(x< 1): 0.010
P(x< 11): 0.085
P(x< 21): 0.180
P(x< 31): 0.235
P(x< 41): 0.335
P(x< 51): 0.530
P(x< 61): 0.700
P(x< 71): 0.735
P(x< 81): 0.860
P(x< 91): 0.940
P(x< 101): 1.000
```

b) min = df['Age'].min()

middle1 = df['Age'].mean()
middle2= df['Age'].mean()+df['Age'].mean()/2
max= df['Age'].max()

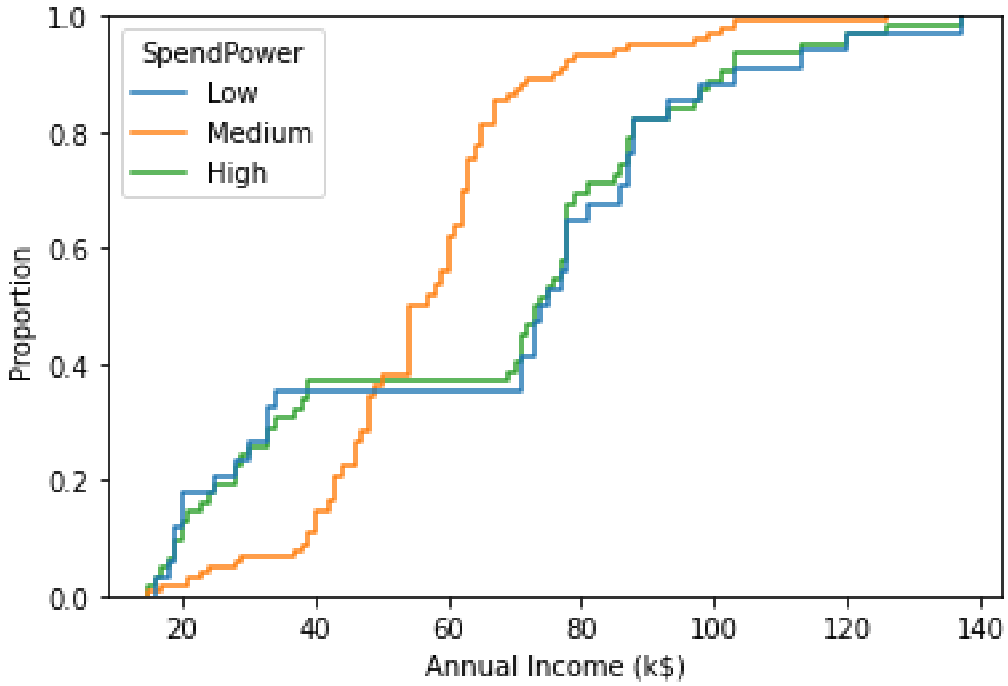
df['AgeGrp'] = pd.cut(x=df['Age'],
                    bins=[min,middle1,middle2,max],
                    labels=['Young', 'Middle', 'Senior'])

sns.ecdfplot(data=df, x="Annual Income (k$)",hue='AgeGrp')



65% Seniors have low income as compared to young and middle aged group

In general young people earn more than middle aged group (62%)



SpendPower
Low
Medium
High
Proportion
0.0
0.2
0.4
0.6
0.8
1.0
20
40
60
80
100
120
140
Annual Income (k$)

c)