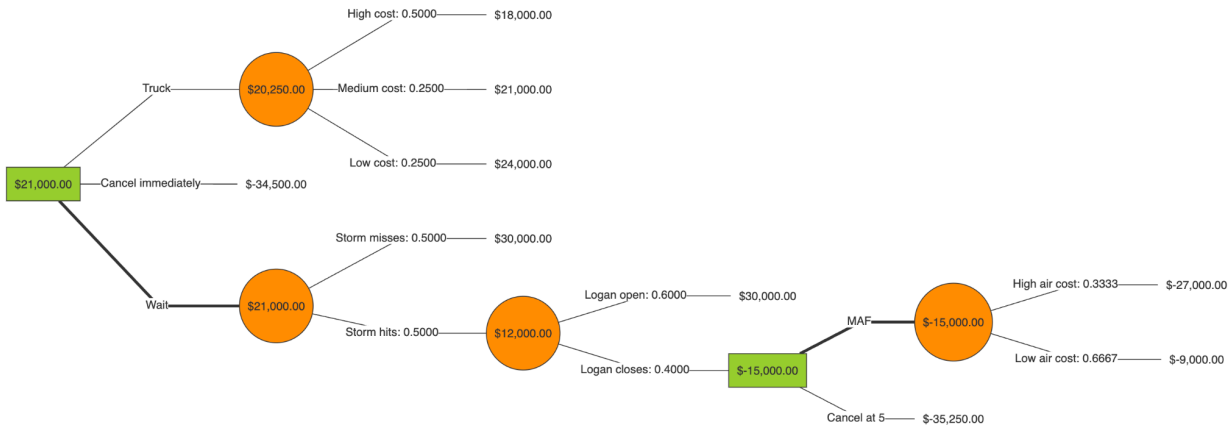
MGTA453 Assignment 1

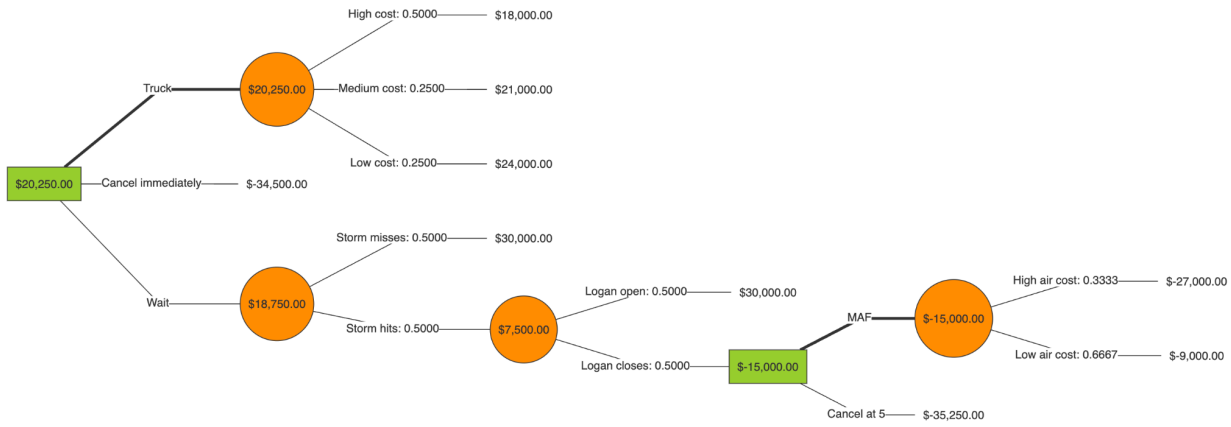
1. The optimal initial decision if the probability that Logan airport stays open if a storm hits drops to 60% is **Wait**

2. The optimal EMV if the probability that Logan airport stays open if a storm hits drops to 60% is **21,000**



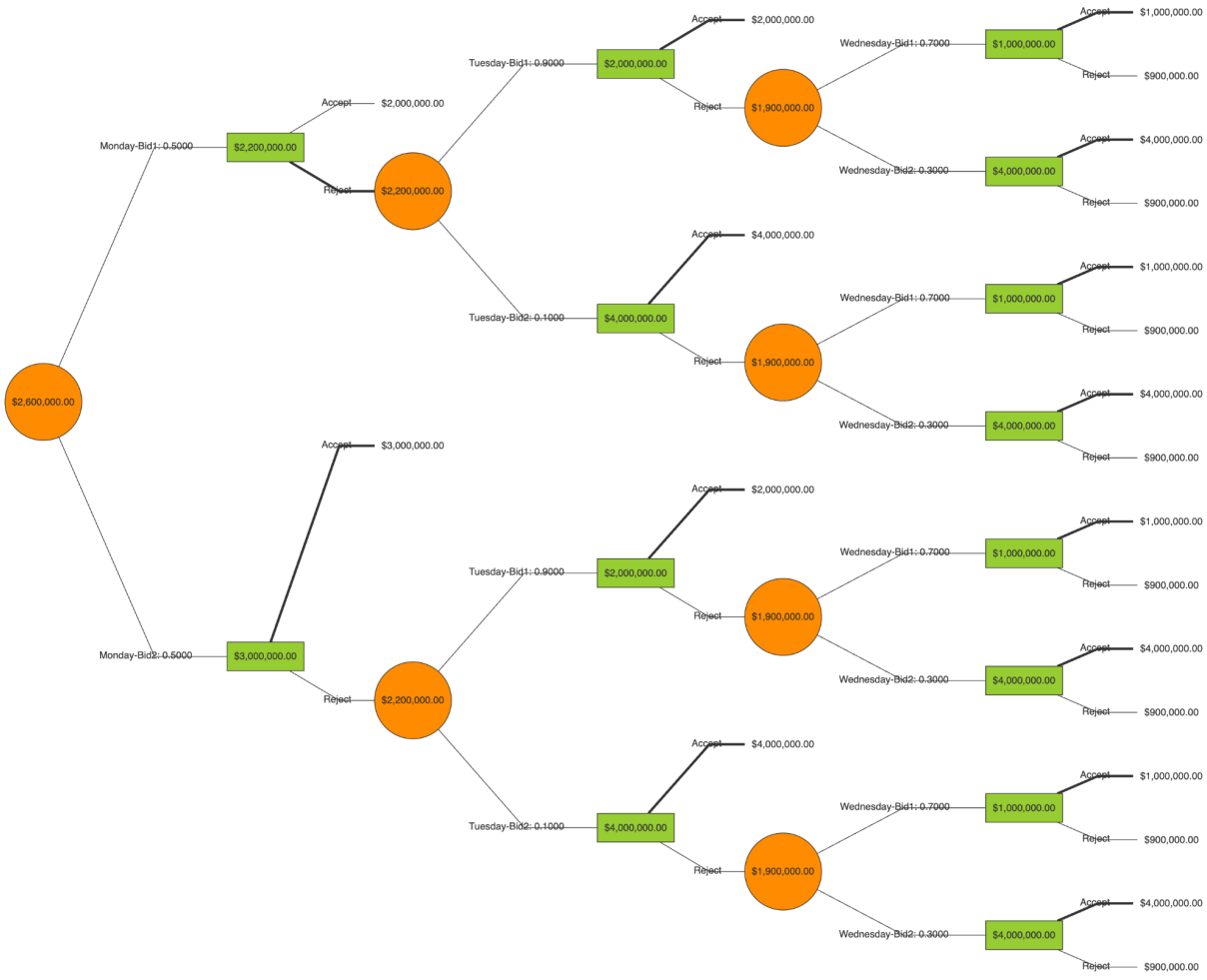
3. The optimal initial decision if the probability that Logan airport stays open if a storm hits drops to 50% is **Truck**

4. The optimal EMV if the probability that Logan airport stays open if a storm hits drops to 50% is **20,250**



Newtowne Art Gallery

Decision Tree Diagram:



CODE

```
name: Art Gallery
type: chance
Monday-Bid1:
   p: 0.5
   type: decision
   Accept:
      payoff: 2000000
   Reject:
      type: chance
      Tuesday-Bid1:
         p: 0.9
         type: decision
         Accept:
            payoff: 2000000
         Reject:
            type: chance
            Wednesday-Bid1:
               p: 0.7
               type: decision
               Accept:
                  payoff: 1000000
               Reject:
                  payoff: 900000
            Wednesday-Bid2:
               p: 0.3
               type: decision
               Accept:
                  payoff: 4000000
               Reject:
                  payoff: 900000
      Tuesday-Bid2:
         p: 0.1
         type: decision
         Accept:
            payoff: 4000000
         Reject:
            type: chance
            Wednesday-Bid1:
```

```
                p: 0.7
                type: decision
                Accept:
                  payoff: 1000000
                Reject:
                  payoff: 900000
              Wednesday-Bid2:
                p: 0.3
                type: decision
                Accept:
                  payoff: 4000000
                Reject:
                  payoff: 900000
Monday-Bid2:
  p: 0.5
  type: decision
  Accept:
    payoff: 3000000
  Reject:
    type: chance
    Tuesday-Bid1:
      p: 0.9
      type: decision
      Accept:
        payoff: 2000000
      Reject:
        type: chance
        Wednesday-Bid1:
          p: 0.7
          type: decision
          Accept:
            payoff: 1000000
          Reject:
            payoff: 900000
        Wednesday-Bid2:
          p: 0.3
          type: decision
          Accept:
            payoff: 4000000
          Reject:
```

```
            payoff: 900000
    Tuesday-Bid2:
      p: 0.1
      type: decision
      Accept:
        payoff: 4000000
      Reject:
        type: chance
        Wednesday-Bid1:
          p: 0.7
          type: decision
          Accept:
            payoff: 1000000
          Reject:
            payoff: 900000
        Wednesday-Bid2:
          p: 0.3
          type: decision
          Accept:
            payoff: 4000000
          Reject:
            payoff: 900000
```

5. True

6. True

7. $ 2,600,000

Dynamic Pricing

```
def optimize_prices(df):

   # Create column for monday and tuesday purchase average
   grouped_df = df.groupby('price').agg({'mon_purchases': 'mean', 'tues_purchases':
'mean'})

   # Create column with tuesday purchase values
   grouped_df['tuesday_price'] = grouped_df.index * grouped_df['tues_purchases']

   # Optimal price for tuesday
   tues_max_value = grouped_df['tuesday_price'].max()

   # Create column with monday purchase values
   grouped_df['monday_price'] = (grouped_df.index*grouped_df['mon_purchases']) +
(tues_max_value * (1-grouped_df['mon_purchases']))

   # Optimal price for tuesday
   tues_opt_price = grouped_df['tuesday_price'].idxmax()

   # Optimal price for monday
   mon_opt_price = grouped_df['monday_price'].idxmax()


   return mon_opt_price, tues_opt_price
```

8. 60
9. 32