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Project 5

**Part I: Series Analysis**

1. 14 out of 15 robberies have occurred on weekdays, with the most common days being Mondays, Thursdays, and Fridays. No robberies occurred on a Sunday and only one robbery occurred on a Saturday which is realistic because banks are typically closed on Sundays and have limited hours on Saturdays. While there is no discernable pattern evident, there was only one time where a subsequent robbery occurred on the same day of the week which was a Thursday.
2. The interval displays a pattern in which it peaks and then decreases for two to three robberies. The peak values are 33 days, 67 days, 92 days, and 27 days. When comparing interval values among the four peaks, the interval increased among the first three peaks but significantly decreased at the fourth peak.
3. When observing time of day, 8 robberies occurred in the afternoon and 5 robberies occurred in the morning which aligns with banks typically being open during business hours. The one robbery that occurred at night was at the Burlington Coat Factory, the only robbery that was not at a bank. Robberies in the morning occurred between 9am and 11am and robberies in the afternoon occurred between 11am and 5pm. Although no distinct pattern is apparent, there are four instances with consecutive morning or afternoon occurrences, involving two to four subsequent robberies.

**Part II: Visuals**

**Klein JLC455 Project 5**

**Part III: Temporal Prediction**

The sixteenth robbery is predicted to take place on Thursday, February 21st, 2019 within the time window of 11 am to 12 pm. Despite there not being a distinct pattern for the day of the week the robberies have occurred, it is feasible to predict the next robbery will occur on a Thursday because it is the most frequently chosen day for 5 robberies and fourteen out of the previous fifteen robberies have occurred on weekdays. The forecasted date of February 21st has an interval of 50 days, positioned at the 95th percentile and approximately one standard deviation above the mean of all previous interval values. This will display a fifth interval peak, following the previous peaks at 33, 67, 92, and 27 days. The progression from the first to the third peak indicates an increase in these values, but there is a sharp decrease by the fourth peak which is why a middle range interval value of 50 days is feasible to predict as the fifth peak. Although the predicted interval percent change is 285% which is not as large as previous peaks of 857%, 608%,and 650%, it still demonstrates the pattern of a sharp increase from preceding

negative values and the overall decreasing pattern in interval percent change peaks. Additionally, the fourteen robberies with documented times have an average hour of 12.57, but there is a notable shift observed in the five most recent robberies which have an average hour of 11. Considering this shift, the alternating pattern in time of day every two to four events, and the last two robberies occurring in the morning, it is plausible that the next robbery will occur in the afternoon between 11 am and 12 pm.