/\*\*\*

\* Joe Moon

\* jmn5y@mail.umkc.edu

\* CS 201R Summer 2020

\* Program 7 - Discrete-Time Simulation

\*\*\*/

PROGRAM 7 RESULTS ANALYSIS

Each printing method (FIFO, SJF, and Multi-Level) exhibits marked advantages and disadvantages making them suitable under different situations. With the same number and sequence of jobs being handled in each simulation, the Maximum Wait Time and Average Wait Times were considered when comparing between the three categories of Administration, Faculty, and Students.

Of the three simulations, the FIFO method offers the most balanced method for handling print jobs with Maximum Wait Times ranging between 261 and 266 for all three categories. The Average Wait Times also exhibit a similar balance with a very narrow range between 99 to 110 minutes.

The other two methods offer results that are significantly more skewed with the SJF method favoring jobs that are smaller in page size, regardless of arrival time or category priority. While this results in a lower range for average wait times (82 to 102 minutes) with short jobs being processed very quickly, maximum wait times increased significantly with an uptick of +100 minutes for each category. This is attributable to long jobs remaining in the pending queue for considerable lengths regardless of arriving early.

The Multi-Level method offers the most skewed approach with Administrator jobs being prioritized above Faculty and then Students. Such an approach results in the shortest maximum and average wait times for any simulation method however that trend reverses itself for Students who experience a significant uptick in wait times, sometimes having to wait over a week to receive their job. Faculty members experience a more median wait time between the two categories but it is still longer than the FIFO and SJF methods employed earlier. It is also important to consider that these extreme wait times may simply be outliers while the other jobs exhibit wait times closer to the mean. An example would be that the maximum student wait time is 11766 minutes while the average was only 294 minutes.

While the FIFO method offers delivery services that are evenly distributed across all three categories, the most efficient method can be obtained by employing the SJF method. Although the maximum wait times for SJF were noticeably higher than FIFO, average wait times for all three categories were significantly lower for SJF which is attributable to the overall total wait time having been reduced by 2056 minutes. It is important to note that only one data sample was employed to draw this conclusion and that using data samples over a longer time frame would provide a more accurate conclusion. Finally, observing the distribution of wait times would provide greater insight which would allow for the accounting of outliers which would ultimately skew the maximum wait time data.