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| St. Bernard Bus Lines | |
| To: | Owner of St. Bernard Bus Lines |
| From: | Emily Zeng, Nicole Kirby, Elizabeth Berryman, Ashley Brainer, and Sam Marshall |
| Date: | 12/3/2015 |
| Re: | St. Bernard Bus Lines Memorandum |

Due to the recent growth of St. Bernard Bus Lines, we have decided to replace the old manual model by utilizing a new DSS model to assign the bus fleet to six destinations. The goal for St. Bernard Bus Lines is to design a comprehensive model to assign bus fleets to the various destinations while minimizing costs. This goal was accomplished by creating several models to assign the bus fleets. The first model was a manual attempt to come up with optimal routing options. Through trial and error, we found a manual solution that met all constraints without minimizing costs. This manual attempt evaluates the passenger and cargo capacity in order minimize costs. The results of the manual attempt yielded a total cost of $39,257 and total gross profit of $280,151.50.

We felt that there was a better solution available that met all constraints while minimizing costs. We set up a second solver in Microsoft Excel to minimize costs while properly assigning the bus routes. This solver yielded a total cost of $37,850 and total gross profit of $258,230.50. This shows that minimizing costs did not maximize gross profit. In order to maximize revenues by utilizing additional cargo space we set up another solver. This solver yielded a total cost of $36,950 and total gross profit of $341,880. This option keeps total costs down while also improving total gross profit. After running a third solver to maximize profit, we found that the results from the second solver matched that of the third, which shows that the second solver was the optimal solution.

After comparing results, we found that the solution provided by the second solver is best for the company. We recommend that St. Bernard Bus Lines utilize their full passenger space and a portion of their cargo space in order to lower costs and maximize gross profit. By utilizing additional cargo space, St. Bernard Bus Line could improve gross profit by approximately $83,649.50. These results show the potential improvement over the current manual system, which also creates the opportunity for increased gross profit.