The Paladin Shuttles: Potential for increasing efficiency in transportation service by proposing a route schedule  
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Abstract
The Paladin Shuttles are a dependable source of transportation that many students at Furman University rely on to get around on campus and to nearby grocery stores and restaurants. The shuttles operate through a call-request service system. There, however, are nights when the shuttles are overwhelmed by calls for rides from students all over campus. Situation like this causes the problem of excessive consumption of gas as the shuttle travels all over campus to pick up its clients. This project aims to identify sites on and nearby campus frequented most by Furman students and construct an efficient bus stop route schedule that would help eliminate unneeded trips to answer request calls. The results should assist Furman University in organizing a transportation system on campus that could potentially be part of the school’s plan to reduce its carbon footprint by decreasing gas consumption.

Introduction
The Paladin Shuttles at Furman University provide transportation for students to and from sites on and off Furman campus. Students can request for rides by phoning 313-7171. However, the convenience of requesting transportation service has sometimes created situations where the drivers have to provide back to back service for one area of campus as individual or groups of students of that area phone in to request for rides. This form of service is disorganized and often leads both the driver and rider to confusion regarding scheduled meeting time and location. A bus route schedule is a potential solution to eliminating the problem of inefficient bus service and excessive gas consumption. There is a rotation of two Paladin Shuttles that provide service to students at nights during the week and weekend. A survey of the places frequented most by the clients of these vans will be conducted to help in the planning of a route system for the Paladin Shuttles.

Frequented Spots on Furman Campus During Week of Oct. 13-20

| Date   | Total Distance (miles) | Total Gas Consumption (gpm) | per Route
|--------|------------------------|-----------------------------|-----------
| #     | Distance (miles) | Consumption | Route A | Route B | Route C | Route D |
| 10/13 | 74.5 | 1.8 | 0.08 | 0.09 | 0.07 | 0.05 |
| 10/14 | 71.5 | 1.8 | 0.08 | 0.09 | 0.07 | 0.05 |
| 10/15 | 55 | 1.6 | 0.07 | 0.08 | 0.06 | 0.04 |
| 10/16 | 44 | 1.7 | 0.06 | 0.07 | 0.05 | 0.04 |
| 10/17 | 59 | 1.7 | 0.06 | 0.07 | 0.05 | 0.04 |
| 10/18 | 64 | 1.8 | 0.07 | 0.08 | 0.06 | 0.05 |
| 10/19 | 67 | 1.7 | 0.07 | 0.08 | 0.06 | 0.05 |

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References
1. Dr. Amelie Davis  
2. Dr. Suresh Mathukrishnan
3. Dr. Pierre Owusu, owner of the Paladin Shuttles  
6. Network Analyst Tutorial  

Conclusion and Future Work
Calculations of gas usage by the Paladin Shuttles on a particular night and those from proposed routes show:
• A bus schedule does have the potential for reducing mileage and yielding a more efficient and reliable transportation system, but the reduction in gas consumption is minimum.  
• Further research is needed to find if a minimum reduction is worth changing the system of shuttle service and whether this new practice will adversely affect students or create any sort of inconvenience for the passengers.  
• Further investigation can use speed limits and loading time at each bus stop to calculate the actual time for a shuttle to travel one proposed route and then determine exactly how many rounds the shuttle can make in one night. The one way function can also help create a more realistic route schedule when considering the distance and time the shuttle can travel on a one way street on campus.