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Subject: Graduation Assignment: Scheduling of AGV systems  
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Context
Prodrive-technologies is a developer and manufacturer of world-class electronics. It comprises over 750 employees and is one of the fastest growing companies in Europe.

Our organization is based on two groups: Development and Operations. The Development department is oriented at developing first-rate electronic, mechanic and software solutions. The operations department is responsible for production, assembly, testing and life-cycle-management of electronic products and systems in the range of 1 to more than a million pieces per year.

Currently, Prodrive is developing AGVs to support factory logistic automation. AGVs are vehicles which autonomously transport goods (e.g. boxes with materials). AGVs are used within a production and warehouse environment for logistic purposes (i.e. goods flow).

A fleet of AGVs is controlled by the fleet management systems. The fleet management system receives its jobs from either a Manufacturer Execution System (MES) or Warehouse Management System (WMS). The MES or WMS determines the goods flow depending on push/pull from e.g. a production process. Jobs are characterized by properties like where to pick-up an item and where it should be delivered. Furthermore, a deadline may be attached to a job to allow efficient (future) scheduling. Scheduling a job over the resources (AGVs) is a function of not only the aforementioned parameters but also the location of the AGVs (e.g. proximity to start of job could be taken into account) and jobs in the backlog.

Since multiple AGVs may be used in a single environment and distances of jobs could be long (more than 500 meter), efficiency can be increased by scheduling the jobs over the AGVs in such a way that jobs are re-ordered while still meeting the deadline and driving times are optimized due to proximity of job end and next job start locations.

Assignment
First the student shall investigate the requirements (open for discussion/suggestions) of the required scheduling algorithm. Next, the literature on scheduling of similar systems will be investigated (state-of-art) and evaluate their advantages and disadvantages. With the acquired knowledge a suitable algorithm is designed and implemented. The implemented algorithm is evaluated for performance using simulation and/or real-world application.

Deliverables
- Specification of scheduling algorithm requirements
- Exploration and selection of scheduling algorithms
- Design and implementation of scheduling algorithm
- Evaluation of algorithm performance