



Designing the Optimal Placement of Spaces in a Parking Lot

A Freshman Engineering Design Project

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Overview:

The owner of a paved, 100 ft x 200 ft, corner parking lot in a New England town needs her parking lot designed. She needs someone to design the layout, or how the lines will be painted. Each student team is being “hired” to do this.

Learning Objectives or Student Outcomes:

By the end of this project, students will be able to

1. Design an effective parking lot using given specifications and considerations;
2. Work as a team to present the design to the class; and
3. Work as a team to complete a detailed written project report.

Length of Lesson:

The length of the lesson will depend upon how much in-class time is devoted to it and on how much out-of-class time the instructor deems appropriate. It shouldn't take more than a few weeks.

Team Size/Composition:

Teams of 4 work best; if necessary, teams of 3 or 5 students may be formed.

How is *positive interdependence* ensured?

Each team will be turning in one parking lot design and one written report.

How is *individual accountability* ensured?

Individual accountability can be ensured through random calling on students or peer assessments. Another idea is to require each student to submit his/her own report detailing the parking lot design, rather than having the group complete one together.

Components of Assessment:

Each team will

- do a brief (**10 minute**) in-class presentation of its design.
- submit a report (**5 pages maximum**) detailing its design.

Team Skills Needed for Success:

Cooperation, communication

Skills Emphasized by:

These skills are emphasized by the need for cooperation and communication in the creation of a collaborative parking lot design. Whether the students complete the written report together or separately, these skills will be emphasized—either because each student wants to be involved in the successful outcome of the group report or because each student wants to be sure he/she knows what is going on so that they can effectively write an individual report.

<p>Materials Needed by Students:</p> <ul style="list-style-type: none"> • Drawing software program (if students choose to turn in their final designs in this way) • Paper, pencils, pens, rulers, etc. (for creation of designs by hand) • PowerPoint (or another presentation software program) if they choose to present their designs in this way. 	<p>Multimedia Needs for Instructor:</p> <ul style="list-style-type: none"> • PowerPoint (or other chosen presentation software programs) for student presentation of designs (if students choose to present this way) • Overhead projection system to accommodate presentations via presentation software programs
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Instructions to Students:	
1	<p>Design Assignment</p> <p>Your team is being “hired” by the owner of a paved, 100 ft x 200 ft, corner parking lot in a New England town who needs her parking lot designed. Your job is to design the layout of the parking lot, or rather, how the lines will be painted.</p>
2	<p>Considerations to Keep in Mind</p> <ul style="list-style-type: none"> • You realize that squeezing as many cars into the lot as possible leads to right-angle parking with the cars aligned side by side. • However, inexperienced drivers have difficulty parking their cars this way, which can give rise to expensive insurance claims. • To reduce the likelihood of damage to parked vehicles, the owner might then have to hire expert drivers for “valet parking.” • On the other hand, most drivers seem to have little difficulty in parking in one attempt if there is a large enough “turning radius” from the access lane. • Of course, the wider the access lane, the fewer cars can be accommodated in the lot, leading to less revenue for the parking lot owner.
3	<p>Frequently Asked Questions</p> <p>Before coming to the instructor with any questions you may have, look over the given FAQs handout to see if your question has already been answered. If not, feel free to ask any questions your team might have.</p>

4	Deliverables Each team will <ul style="list-style-type: none">• do a brief (10 minute) in-class presentation of its design. (You may use a drawing program to represent your design if you choose. You may also use a presentation program, such as PowerPoint, to present your design. If you choose to present this way, please let the instructor know.)• submit a report (5 pages maximum) detailing its design.
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Handouts:

- [Frequently Asked Questions \(FAQs\)](#)

Frequently Asked Questions (FAQs)

Q: For what kind of company will the lot be?

A: Although there may well be some situations in which this information is important, it simply is not available. Unfortunately, the group for which we are working has not made a final decision as to the type of enterprise they will be developing. Amazingly enough, I have been led to believe that the final decision will come down to a plumbing supply business or a specialty shop for lampshades.

Q: Does the company receive deliveries via large trucks?

A: The company may well receive deliveries via trucks. However, the trucks will not be of the eighteen-wheel type; they will simply be on the order of panel trucks.

Q: Where is the building in relation to the lot? (Do we need fire lanes?)

A: The building will be across the street from the parking lot. You will not have to worry about including fire lanes.

Q: Is the lot a corner lot?

A: The lot is a corner lot. However, please be careful about making implications from this information. The lot has a single entrance. This entrance is located in the middle of one of the long sides of the parking lot (in the middle of the 200 foot long side).

Q: Is there a dumpster that must be emptied from inside the lot?

A: There is no trash dumpster involved in this effort. You need not consider a dumpster.

Q: Are handicapped spaces needed/required?

A: You will need to include three handicapped spaces in the lot.

Q: Is there much traffic around the lot?

A: Hmmmm.... Kind of difficult to answer. The parking lot is not in downtown Atlanta, nor is it in Quincy, Florida. I guess the lot is in an area with light to moderate traffic.

Q: Could we have a photograph/sketch of an overhead view of the lot, building, and surrounding area?

A: No such photograph is available.

Q: Where is the building in relation to the parking lot?

A: The building will be on one of the 200 foot sides; more specifically, it is on the side with the entrance.