GarageMonkey – automating parking garages

##### Project Problem:

Operating and maintain a parking garage currently requires a lot of manual operation which is time consuming, tedious and error prone. Garage operators need to manually register all the available spots, their sizes (motorbike, car, buses or other heavy vehicles), prices of individual spots and many other details. When a customer walks-in, the operator has to scan through the whole register for today to find an available spot. If the customer has monthly (or any other recurring parking permit) then that becomes an extra step to accommodate. Once a parking spot has been assigned and customer has paid for the parking, generating invoice becomes another time consuming process.

Once a customer has parked their vehicle and wants to extend their reservation, this again requires a manual process of either walking in the garage structure once again or making a phone call, which can cause a long wait. This inefficiency coming from manual steps consume a lot of time on operator’s part, which ultimately result in long lines, bad customer experience causing bad reviews and overall loss for business owners and stakeholders.

GarageMonkey is a web application, which aims to solve the inefficacy of parking garage operations and also provide new features, which will enable better utilization and management to parking spots to provide a seamless customer experience. GarageMonkey automates end-to-end workflow of parking a vehicle in a garage starting with setting up a new garage, allocate unique user friendly identifiers to individual spots, handling walk-in customers as well as allow online registration. Customers will also be able to extend an existing reservation online if there are spots available, without going through any manual step.

Customer will also be able to create their profile, add their contact details and setup recurring payment to further save time. This will enable customer to reserve parking spots quickly and efficiently. These customer details can also be used by Garage business to send offers, garage closer dates and many other useful information, which will be helpful for both customer and business.

##### Capabilities:

In a nutshell, GarageMonkey provides following features:

1. Garage administrators will be able to setup a garage in terms of number of levels, number of spots on each level, kind of vehicle supported by a parking spot (motorbike, car, truck etc.), parking fee for the spots, available time and other important details related to the parking spots.
2. Garage administrator will be able to add/modify/remove operators (employees of the garage) in the system. Operators will be able to login, assign parking spots to walk-in customers, validate parking permits of online reserved spots, view current state of parking garage (parked vehicle at spots etc.), search for a vehicle, check-out a vehicle from the garage and other important functions related to garage day to day operations.
3. Customer will be able to reserve a parking spot online, make the payment and get the reserved spot number along with a confirmation email, without having to register or login to the web application.
4. Customers will also be able to create their profile, add their details along with payment information in order to reserve the parking spots efficiently without having to enter details again and again.
5. The application will also find the most efficient way to park a vehicle. For example, if a parking spot can park 3 motorbikes, 1 car and can be combined with 1 other neighboring spots to park a bus/truck, the system will be able to efficiently find a spot based on vehicle category.
6. Administrators will be able to send mass emails, send offers and run other campaigns using registered and non-registered user’s details.

##### Technologies Used:

GarageMonkey is a Java/J2EE based web application. Following the technologies used in the implementation:

1. *Apache Tomcat:* Used as a web server. The web application is deployed in tomcat.
2. *Apache Ant:* Used as a build tool. Developers can build, test and deploy the application using ant targets provided.
3. *Servlet and JSP:* Used for server side programming, reading HTTP request, maintaining web sessions and sending HTTP response with the requested information.
4. *MySQL:* database server to permanently store garage and user details.
5. *HTML, CSS, Javascript/jQuery:* Client side (browser) programming along with validations on the user interface.
6. *XML:* Storing configuration details.
7. *log4j:* Server side logging of user events and other debugging information.