We designed and built an automated shopping cart that can maneuver through a specialized shopping center. The entire system is meant to make the process of shopping an easier experience by guiding the shopper through the center to maximize their shopping experience. This process is made possible through the use of a BASIC Stamp and a PBasic program customized for our needs. The shopper simply pushes the button on the cart that lists the product that the shopper needs and the cart will automatically move to the appropriate area within the store.

This project is contained within the field of mechatronics. Mechatronics is compromised of several components that work together in order to form a complete system. This arrangement combines electrical, mechanical, and computer components into a single working product. Products such as these are commonly used in everyday life and are necessary in the world in which we live today. Some examples of mechatronics products are washing machines, change dispensers, and even microwaves. The ability to combine the components into a networked procedure that will function as a whole is completed through specific computer programming that weaves together with a variety of sensors and actuators to fulfill certain assigned tasks. These tasks can range from the most simple to the most advanced, but without the help of mechatronics life as we know it would be completely different.

The majority of mechatronic products require a BASIC Stamp in order to relay information from a computer component to a mechanical component; this is done through the use of circuits and other electrical components. There are many types of BASIC Stamps that can handle various tasks given. Our project required the BASIC Stamp 2, which is a 24-pin DIP (Dual inline package) module. Most commonly referred to as a microcontroller, on occasion you may see it being called a single board computer since it has its very own processor, memory,

clock, and interface (via 16 I/O pins). The BASIC Stamp essentially serves as the brains inside of electronics projects and applications that require a programmable microcontroller. It is able to control and monitor switches, timers, motors, sensors, relays, valves, and more; all through the PBASIC language.

We built a prototype of the shopping cart out of plexi-glass; this allows a clear view of the circuitry within the shopping cart. The cart is 8 1/2" high, 8" wide, and 4" deep; it is comprised of two detachable parts; one is the base which includes 3 wheels, 2 of which are controlled by servo motors, the battery pack, 3 ultrasonic sensors, and the BASIC Stamp; the base is connected to the apex through the use of 4 columns.

The programming for the cart is a PBasic program that uses a coordinate plane in order to give specific directions to the cart. The x-coordinates on the plane are read first and direct the cart to the proper aisle, in numerical order. The y-coordinate is used to tell the cart which section of the aisle the needed product is located in, again in numerical order.

The automated shopping cart can maneuver through the specialized shopping center. The entire system makes the process of shopping easier by ordering items into a logical arrangement and guiding the shopper through the center, maximizing their shopping experience. The system as a whole has many benefits among them are the contributions to the elderly because it moves a normally heavy cart independently, and guides them through the center without the strain of reading signs that are hung high overhead, new shoppers at the center can quickly complete their shopping because they do not waste time searching for products. Overall consumers take advantage of being able to enter and leave the shopping center more efficiently and quicker then the average trip. It allows a convenient alternative to searching for products throughout aisles or asking for help. In addition this benefits the retailer too; older costumers are forced to walk

through at least part of the aisle which they normally would not be interested in, this increases impulse buying. Because lower number of employees would be needed to assist costumers in finding products more cash registers could be open, this would make the wait shorter and the costumers happier. All of these things add up to a beneficial setup for everyone involved.