

Table of Contents

System Architecture.....	1
Components	1
Grabbers.....	1
Wind Turbine Claw.....	1
Botguy Claw	1
Black Line Detector	2
Game Flow Control.....	2
Leave_Starting_Box().....	2
Get_Botguy()	2
Go_To_Hill()	2
Stop_At_Peak().....	2
Score_Points().....	2
Flowchart	3

System Architecture

Our CBC-Create robot's software uses a task based approach in order to make the robot easier to code and debug. Each task the robot needs to complete is written into separate functions. In addition the robot must keep track of its mechanical features in order to maintain efficiency. The following are the components used to support the mechanical features and the functions used to interface with them.

Components

Grabbers: the grabbers are a pair of Lego pieces attached to VEX motors which are used to contain game board pieces and extend the grabbing range of the robot. They are moved either outwards or inwards and are interfaced with by using the functions `Left_Grabber(Position)` and `Right_Grabber(Position)`, with `Position` being the position the function will move the grabbers to.

Wind Turbine Claw: the wind turbine claw consists of a servo which opens and closes a claw attached to a motor which moves said claw up and down. This claw grabs the wind turbine located near the starting box and places it in a foundation once the robot reaches the peak. The wind turbine claw is interfaced with using the function `Wind_Turbine_Claw(Open, Up_Position)`, with `Open` being either 1 or 0 with 1 being open and 0 being closed and `Up_position` controlling the vertical positioning of the claw.

Botguy Claw: the botguy claw is a very simple claw which is closed by a servo and is designed to hold botguy above the ground. The claw has two positions, open and closed, which are controlled through the function `Botguy_Claw(Open)`, with `Open` equaling either 1 or 0 with 1 being open and 0 being closed.

Black Line Detector: the tophat sensor attached to our robot is used to sense the black lines located on the board. This is done using a function called `Line_Check()`; which checks to see if a line is present. `Line_Check` uses a value for the default light value of the board which is set using `Line Calibrate()`, a function which uses the tophat sensor to set the light value for the board.

Game Flow Control

In order to make the robot's software easier to debug we also separated each task the robot was to do into a function which enabled us to locate errors quickly and also to easily understand our code. The following functions are used to complete the various Tasks the robot must do.

Leave_Starting_Box(): the function "`Leave_Starting_Box()`" has the robot leave the starting box and drive so that the robot is perpendicular to botguy. During this function the robot will call the `Wind_Turbine_Claw` function to grab the wind turbine located in the PVC pipe next to the starting box. It will then call the functions for the left grabber and right grabber and open them up in order to increase the grabbing range of the robot. The robot then turns itself around and starts to move out of the starting box.

Get_Botguy(): the function `Get_Botguy()` is a very simple function which moves the create forward toward botguy and then calls `Botguy_Claw(0)`, in order to close the claw around Botguy.

Go_To_Hill(): `Go_To_Hill()` is a function which contains drive statements which moves the create to a position where it is able to drive straight up the peak. At the end of this function the left and right grabber functions are called and have the grabbers contract slightly so as to hold in the objects the create has picked up while it drives up to the peak.

Stop_At_Peak(): `Stop_At_Peak` is a function that utilizes the function `Create_Drive_Straight()` in order to drive the create to the top of the peak. The create makes use of both the `Black_Line_Detector()` function to stop at the line signifying the beginning of the peak or automatically stops after 750 milliseconds.

Score_Points(): this function is the end of the creates code, the robot turns into the peak and uses the `Wind_Turbine_Claw` function to place the wind turbine in a foundation. Finally the `Botguy_Claw` function is called to release botguy so that he is touching the ground. In order to demonstrate that there is no code left to run the create will display the phrase "Can I have a cheeseburger?" on its screen, which indicates that the program is at its end.

Flowchart

