Jurassic Park

**Objective:**

The objective of this project is to write a program that simulates Jurassic Park. The user will act as the park ranger and tend to the needs of the dinosaurs. They will also be responsible for some of the logistics of the park including lockdown and security procedures in case of an emergency. Dinosaurs will get mad and break out if they aren’t fed, so the ranger will have to be sure to feed them periodically or the park might be destroyed!

**Requirements:**

1. The system must have at least 3 types of dinosaurs, each with a unique name, hunger capacity, type (herbivore, carnivore) and sound.
2. The system must have at least 3 different kinds of food (sheep, watermelon), each with a certain amount of food units.
3. The user will have to first login with a set username and password (this can be preset), then there will be a menu that allows them to choose which dinosaur paddock to visit. At each paddock, the user can view the statistics of the dinosaur (name, hunger level, type), listen to their sound, and feed them.
4. The user will have to drive a Jeep between paddocks since they’re not within walking distance.
5. Each dinosaur should have a unique hunger capacity (in food units) which goes down over time. In order to replenish it, the user will have to feed them the appropriate food to restore that food’s amount of units. If a dinosaur’s hunger reaches 0, then it should get mad and break out of containment. This should cause the system to alert the user that a dinosaur broke out and play that dinosaurs sound. This should also start a new countdown. If the user doesn’t call security before time is up, the dinosaur will destroy the park.
6. If the user tries to feed the dinosaur the wrong kind of food, the dinosaur will just get mad and make its sound instead of eating.
7. If the park is destroyed there should be a failure message on the screen and the program should reset.

**Peripherals:**

1. **Stepper Motor:** The stepper motor should act as the ranger’s wristwatch. It should tick clockwise once every second. When the dinosaur breaks out, it should start to tick faster to add to the panic!
2. **DC Motor:** The DC motor will simulate the Jeep that the park ranger uses to drive between paddocks. Each time the user chooses a new paddock, there must be a short drive simulation with a rotating dc motor while the user “drives” there. The user should be able to adjust the speed of the Jeep using the potentiometer as the gas pedal. This should make the motor spin faster but magically will not affect trip time.
3. **Keypad:** The keypad will be used to enter in credentials when the ranger clocks into work. This will be required to enter the main system menu and start the simulation. It will also be used to make menu choices in each of the system menus.
4. **Potentiometer:** The potentiometer should be used to scroll between menu options in the main setup menu. For example, if there are three dinosaurs to choose from, the LCD screen should display one at a time for choosing and the potentiometer will be used to cycle through them. It should also be used to control the speed of the Jeep (DC motor) while driving between paddocks.
5. **LCD:** The LCD will be the main display for the menu and alert system. It will display the menus and various messages such as dinosaur hunger level and emergency alerts when dinosaurs break out.
6. **Push Button:** The push button should be used to initiate a lockdown and call security when a dinosaur breaks out. It will first ask the user for their password, then sound the system alarm and broadcast a message over the LCD to call security. If this isn’t done in time after a dinosaur breaks out then the park will be destroyed.
7. **Speaker:** The speaker should be used to play dinosaur sounds and the alarm when security is called.
8. **Switches:** The switches should be used as a security handbrake for the Jeep. It shouldn’t move until the user has entered the correct configuration (can be preset). One switch should also be used separately to control the alarm system. If this switch is set, the alarm will sound. Otherwise it will not and security will not receive an alert even when the push button system is used.
9. **LEDs:** The LEDs should show the dinosaurs hunger when the ranger views their statistics (as a rough percentage out of 8). They should also flash on and off when the alarm is sounding.
10. **RTI:** A real-time interrupt should be used to control all the system timing. No delay subroutines are allowed except for the keypad debouncing.

**Note:**

You are encouraged to be creative and make this project your own. You can make reasonable assumptions in the development of this project, but keep in mind that the assumptions must make sense to the user (and to the Lab TAs).

If you have any questions pertaining to this project, please discuss it with your Lab TAs as early as possible. You may use any C code provided through the lab, but all other codes must be written in assembly.