

The LockCracker

www.thelockcracker.com

Final Project for Principles of Engineering class
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Aim: The purpose of this multidisciplinary course was to build a **mechatronic** system of our choosing. Team JARJ decided on building a **lock-cracking device**. The LockCracker was set to take a combination lock with an unknown combination and unlock it and **display the correct combination** to the user via a **Python GUI interface**. This flexible electromechanical system should be modifiable to fit any turn-dial lock.

Solution: Team JARJ mechanically turned the dial on the lock and pulled on the latch with every combination that was tried. I worked on the electrical and software systems.

Design: As follows for the electrical & software subsystems:

1. We used a **stepper motor** with the accuracy needed for the lock's dial to turn to different numbers.
2. We attached a pull-in solenoid to the lock's latch to pull every time a 3-number combination was tried.
3. A limit switch was placed in front of the latch's connection to the solenoid. When the latch opens and the switch is triggered, the system knows to stop and display the result on the GUI for the user.
4. We used a **PIC microcontroller** as the brain behind the controls.
5. And, we designed a **modular Python back-end** to fit to any type of dial that is available in the market.

Finally, the user-interface was designed to **minimize the time taken** by the LockCracker to solve the lock. The user is prompted to enter how many of the numbers they know of the combination and the LockCracker optimizes the procedure accordingly.

Today, the LockCracker has received **publicity** on *Wired.com*, *Popsci.com*, *ASME Magazine*, and more.

