Lock And Unlock Any Computer Using Arduino And RFID

The first step is to understand the various components used in this project.

Step 1: Component Identification

Hardware used in this project:

1. Arduino Uno
2. RFID Scanner
3. RFID tags
4. Jumper wires
5. Breadboard

Software used in this project:

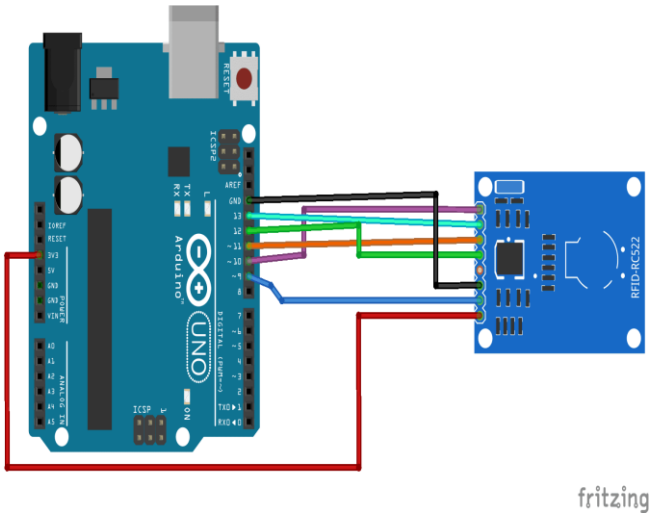
1. Arduino
2. Atmel flip

Once, you have all the components required for the project, the next step would be to make the connections.

Step 2: Connections

NOTE: Make the Connections **exactly** as given below; else, you would have to modify the code.

Pin	Wiring to Arduino UNO
SDA	Digital 10
SCK	Digital 13
MOSI	Digital 11
MISO	Digital 12
IRQ	unconnected
GND	GND
RST	Digital 9
3.3 V	3.3V



Once, the connections are made, you are ready to get started with the software part of the project.

Step 3: Changing The Code

Firstly, make sure you add **MFRC522** Library to Arduino IDE

To do this, first go to this page: https://github.com/miguelbalboa/rfid

Download and Extract the library into libraries folder in Arduino Sketch Folder.

If you don't know where the Arduino Sketch Folder is, Don't worry. Follow the steps given below.

1. Launch Arduino IDE.
2. Click on files and then go to preferences.
3. You should be able to find your Sketchbook location here.
4. Now, navigate to this folder using Windows Explorer.
5. If there is no **Libraries** folder there, create one.
6. Extract the downloaded MFRC522 Library inside this folder.

Once you are done adding the library, you are all set up for editing the code.

The first change you have to do is modify your UID number.

```
  // Select one of the cards
  if ( ! mfrc522.PICC_ReadCardSerial())
  {
    return;
  }
  //Show UID on serial monitor
  String content= "";
  byte letter;
  for (byte i = 0; i < mfrc522.uid.size; i++)
  {
     content.concat(String(mfrc522.uid.uidByte[i] < 0x10 ? " 0" : " "));
     content.concat(String(mfrc522.uid.uidByte[i], HEX));
  }
  content.toUpperCase();
  if (content.substring(1) == "E6 F4 94 F4" , "B3 C9 2C 83" , "F3 68 47 0C" ) //change here the UID of the card/cards that you want to give access
  {
     delay(50);

buf[0] = 0;
buf[2] = 0xE3; // Win Key
buf[3] = 0x0F; // letter L
Serial.write(buf, 8);
releaseKey();

delay(200);

buf[0] = 0;
buf[2] = 0x04; // letter A
Serial.write(buf, 8);
```

The Line Highlighted is the UID of my RFID tags. Modify them and add your UID

Once you are done modifying the UID, Its time for you to change the keystrokes.

Keystrokes are the keyboard strokes you make to enter your computer password, in other words your computer password. So first, you convert your computer password into keyboard strokes using the pdf(USBKeyScan) I've added in the repository

By Default, my code is set to type ABCD as the keystroke(I had set my computer password as ABCD), to set your password

```
buf[0] = 0;
buf[2] = 0xE3; // Win Key
buf[3] = 0x0F; // letter L
Serial.write(buf, 8);
releaseKey();

delay(200);

buf[0] = 0;
buf[2] = 0x04; // letter A
Serial.write(buf, 8);
releaseKey();

delay(50);

buf[0] = 0;
buf[2] = 0x05; // letter B
Serial.write(buf, 8);
releaseKey();

delay(50);

buf[0] = 0;
buf[2] = 0x06; // letter C
Serial.write(buf, 8);
releaseKey();

delay(50);
```

You have to edit the highlighted code. Don't change anything, just go to

buf[2] = 0x**04**; and change the highlighted number into the keystroke number of the first letter of your password using the USBKeyScan.pdf.

Similarly modify the next buf[2] = 0x05 to the second letter of your password.

If you want to use more letters, just copy the code and paste it and modify the key scan numbers into that of your password.

NOTE: Make sure you copy the **delay(50);** as well

Finally, after modification, upload the code to Arduino Uno by selecting the correct port and correct COM port.

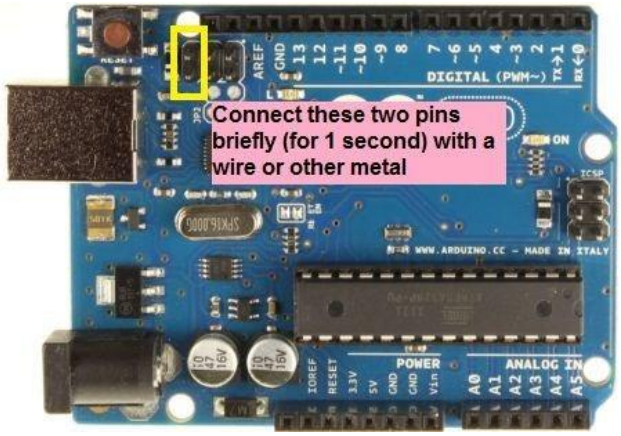
Once you are done with uploading the code, it is time for you to update the Firmware of Arduino in order to change it into a keyboard. So that it can enter your password when locked or press Win+L to lock the computer.

Step 4: Upgrading the Firmware of Atmega16U2 on Board

Download and Install the Software Atmel Flip 3.4.7 from:

http://ww1.microchip.com/downloads/en/DeviceDoc/JRE%20-%20Flip%20Installer%20-%203.4.7.112.exe

I have the Firmware files in repository, Download them.



Now, follow the steps given below:

1. Place a jumper on reset and ground and remove it like in the picture
2. Open Atmel Flip and select the firmware file Arduino-Keyboard-0.3.hex from File Tab -> Load Hex File
3. Select Run.
4. Remove USB and plug it again.

NOTE: if there was an error in the code and you want to update it and upload it again into your Arduino, you might notice that your Arduino does not show up on your COM ports. Don't worry, this happens because you have updated the firmware of your Arduino. All you have to do is, repeat the above step but instead of selecting Arduino-Keyboard-0.3.hex you have to select the Arduino-usbserial-uno.hex file and repeat the steps again. Now when you connect again, your device will be recognised as Arduino Uno.

Once you are done with updating the firmware, it is time to test your hardware.

Step 5: Testing

Connect your Arduino to the computer and slowly move your RFID tag towards your RFID scanner.

If your computer were in the unlocked state, the Arduino would press Win+L and send it to a locked state. Withdraw your RFID Tag.

If your computer were in the locked state, the Arduino would enter your password based on the keystrokes you have entered in the code and then presses enter to unlock your computer. Withdraw your RFID Tag.

This Concludes all the steps required to create this project. To understand various components and working principle behind it. Read the Documentation present in the folder.

Thank you,

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