

# AVR X-mini Poker Game

## Hardware Configuration

This project uses the 2-line x 16-character LCD module connected to the AVR “X-mini” board. Instructions for wiring the LCD panel can be found in a separate document: “X-mini LCD Test Activities (v2)”. Be sure to test the LCD before proceeding.

A push-button switch is connected from pin PD2 to GND.

Optionally, for “jackpot” display, connect 6 LEDs to port B pins PB0 ~ PB5.

## Code Library

The application requires the **X-mini code library** to be included in the Microchip/Atmel Studio project, in much the same way as you did for other projects.

There is a “pseudo-code” outline program provided on which to build this application. Download the outline program and copy it into your Atmel Studio 7.0 project folder when you create the project.

Study the provided outline program to understand its workings. Add your own code to complete the application which operates according to the following requirements.

## Program Requirements (Specification)

- Display initially shows "AVR Poker Game" | " Press Button A ".
- Step 1: Waiting for button press.
- Holding down the button causes a set of 4 symbols to update randomly on the display (top line), like the 4 “wheels” on a real poker machine. The display should update at a rate of about 5 Hz. This continues while the button is held pressed.  
Any 8 different symbols may be chosen from the LCD CGROM character set (extended ASCII set). Some of the Japanese characters make good symbols. (Refer to LCD module data-sheet.)
- Releasing the button starts a 3-second timer. The random symbol selection and display update continues, however, until the 3-second timer expires; then the random display stops and the last 4 selected symbols are shown.
- The last 4 displayed symbols are compared with a “winning pattern” comprising 4 identical symbols.
- A 'win' is indicated by flashing [\*\*\* WINNER \*\*\*] on the bottom line of the display, and (optionally) one or more LEDs flashing; otherwise the display shows “Sorry, you lose!”. A 5 second timer is started.
- After the 5 second timer expires, the display shows “PLAY AGAIN ?” on the bottom line and the sequence repeats from “Step 1”.

Bonus points for implementing the following additional features:

- Instead of a simple “win or lose” outcome, extend the game so that there are 3 “levels” of winning patterns based on the number of matching symbols, i.e. any 3 identical symbols, any 4 identical symbols, or 4 particular identical symbols. This last outcome is called a “jackpot”. (What is the probability of this happening?)
- For a winning outcome, the text displayed on the LCD bottom line should alternate (slowly) between “\*\*\* WINNER \*\*\*” and “ Payout = \$xx ” where the payout amount is based on the inverse probability of the outcome.
- The payouts should be adjusted so that the machine takes a 10% “commission” over a very large number of plays.

 <p>Step 1: Waiting for button press</p>	 <p>Waiting for button release... (the 4 symbols are changing randomly)</p>
 <p>3-second timer expired: show outcome</p>	 <p>5-second timer expired: play ended</p>
 <p>Showing “win” outcome (extended version) (Any 3 identical symbols -- Payout = \$2)</p>	 <p>Alternating “win” outcome (ext'd version) (Any 4 identical symbols, except ‘111’)</p>
 <p>Showing “Jackpot” outcome (4 identical symbols with code = ‘111’)</p>	 <p>Alternating “Jackpot” outcome</p>