123D Circuits Arduino LCD Game

Making a great many things is very easy with Arduino microcontrollers. This Instructable tells you how to create a simple 1-button video game made from a handful of parts in the Arduino Basic Kit (https://123d.circuits.io/shop/arduino?utm_source=instructables&utm_medium=instructable&utm_content=arduino-lcd-game&utm_campaign=arduino-lcd-game) from 123D Circuits (https://123d.circuits.io?utm_source=instructables&utm_medium=instructable&utm_content=arduino-lcd-game&utm_campaign=arduino-lcd-game). It is a side-scrolling jumping game. This serves as a good starting point for creating your own games from simple maker electronics.

Parts list (all can be found in the Arduino Basic Kit (https://123d.circuits.io/shop/arduino?utm_source=instructables&utm_medium=instructable&utm_content=arduino-lcd-game&utm_campaign=arduino-lcd-game)):

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joshua.brooks (/member/joshua.brooks/)

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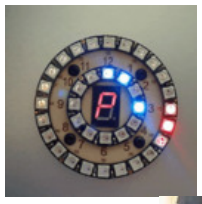

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Tags: arduino (/tag/type-id/keyword-arduino/) lcd (/tag/type-id/keyword-lcd/) game (/tag/type-id/keyword-game/) electronics (/tag/type-id/keyword-electronics/) 123D Circuits (/tag/type-id/keyword-123D%20Circuits/)

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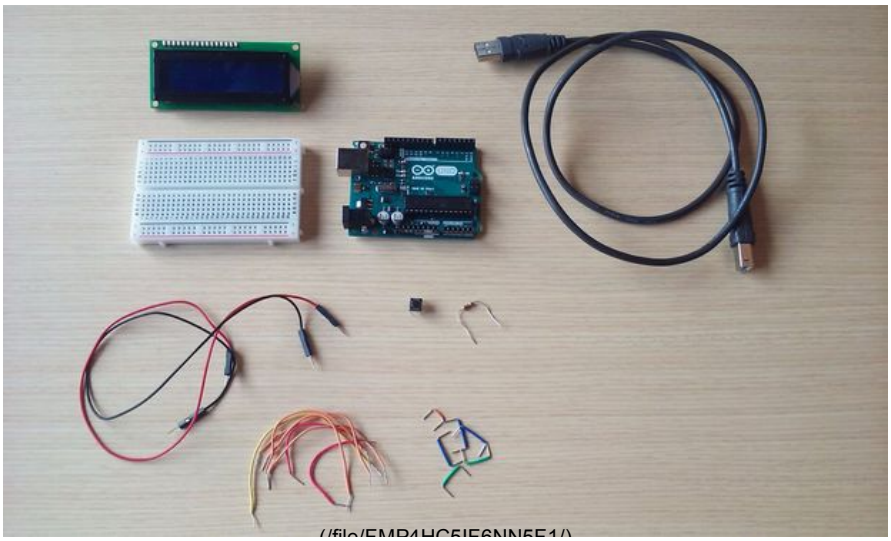
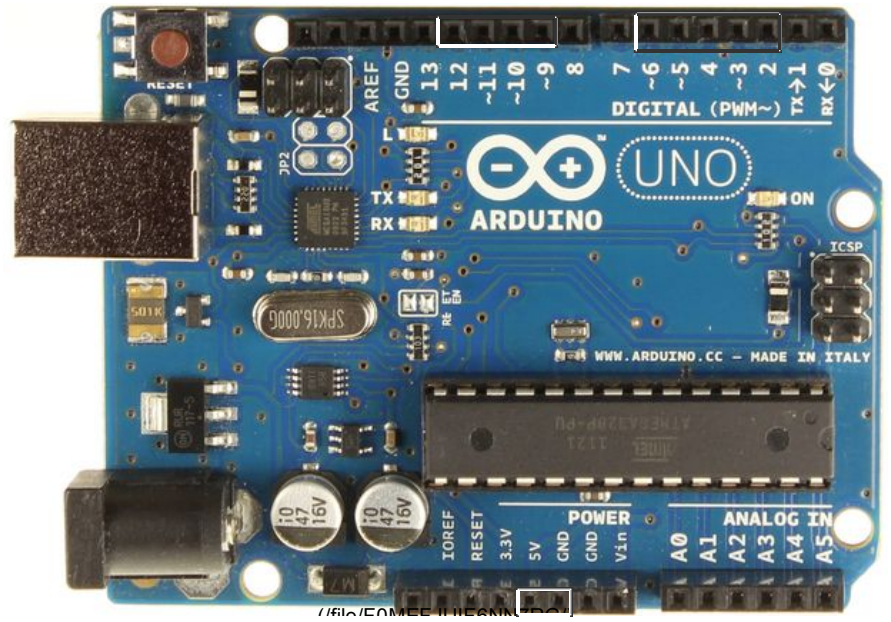
by ALP Electronic Innovation (/member/ALP+Electronic+Inno

- 1 x Arduino UNO
- 1 x LCD screen (16 x 2 character)
- 1 x Electronics breadboard
- 1 x 220 Ω resistor
- 1 x Pushbutton switch
- Solid-core hookup wire
- 1 x USB cable

Step 1: Assembling the parts





The parts needed are shown in the picture above.
Start off with the Arduino unpowered. Do NOT plug in the USB cable. That will happen in a later step when it is time to program it and try the game out.

Use a long hookup wire to connect the 5V signal on the Arduino to the far left of the red row at the top of the breadboard.

Use a long hookup wire to connect the GND signal to the far left of the black (or blue on some breadboards) row at the top of the breadboard.

The LCD (Liquid Crystal Display) module has a 16-pin male header on the underside. Plug this into the breadboard as shown in the picture. All of the electronic signals that power and control the LCD go through this header.

These pins are (from left to right):

1. GND - power ground signal
2. VCC - positive power signal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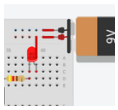
The CupGame (/id/The-CupGame/)
by rhaataja (/member/rhaataja/)


Zero to Breadboard Simulation (/id/Zero-to-Breadboard-Simulation/)
by 123D Circuits

3. V0 - contrast adjust
4. RS - register select
5. R/W - read/write select
6. E - operation enable signal
7. DB0 - data bit 0 (not used here)
8. DB1 - data bit 1 (not used here)
9. DB2 - data bit 2 (not used here)
10. DB3 - data bit 3 (not used here)
11. DB4 - data bit 4
12. DB5 - data bit 5
13. DB6 - data bit 6
14. DB7 - data bit 7
15. LED+ - backlight LED positive
16. LED- - backlight LED negative

Using short hookup wires, connect GND and LED- (pins 1 and 16) to the black row at the top.

Similarly, connect VCC (pin 2) to the red row at the top with a short hookup wire.

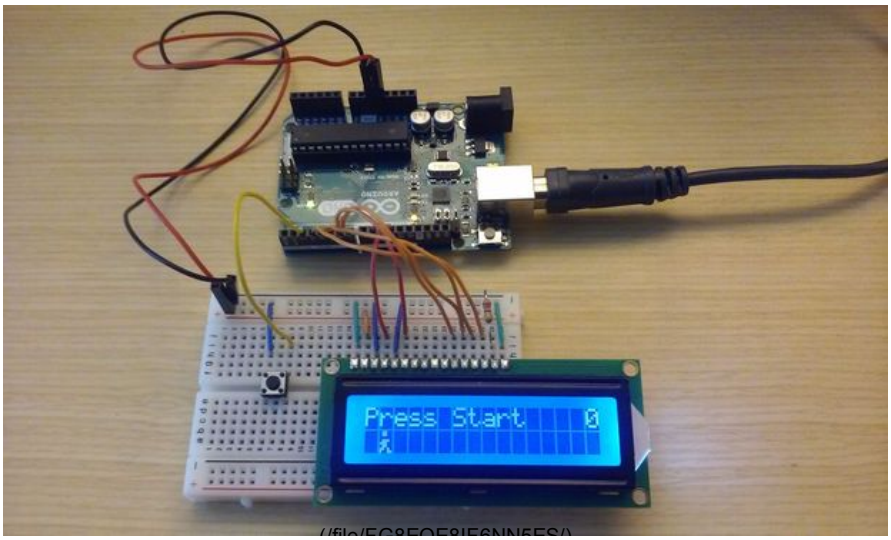
Bend the wire leads of the 220 Ω resistor (red-red-brown colored bands) and connect it between LED+ and the red row at the top of the breadboard.

Use longer hookup wires to make the remainder of the connections:

- Connect DB7 to Arduino pin 3
- Connect DB6 to Arduino pin 4
- Connect DB5 to Arduino pin 5
- Connect DB4 to Arduino pin 6
- Connect E to Arduino pin 9
- Connect R/W to Arduino pin 10 (or to black row at top of breadboard)
- Connect RS to Arduino pin 11
- Connect V0 to Arduino pin 12 (or to black row at top of breadboard)

Plug the pushbutton somewhere to the left of the LCD screen, straddling the channel running along the center of the breadboard (see picture above). Connect one of the top two pins of the button to the black row at the top of the breadboard using a short hookup wire. Connect the other pin at the top of the button to pin 2 of the Arduino.

Step 2: Programming the Arduino



At this point, you should be ready to program the Arduino and test it out.

Start by making sure that you have the Arduino software installed on your computer. Download the LCD_Game.ino file on this page to your computer and open it in the Arduino software. Make sure the board is set properly for programming (Tools → Board →Arduino Uno).

Connect the Arduino to your computer using the USB cable. This will provide power to the Arduino/game and allow you to upload your program to the Arduino.

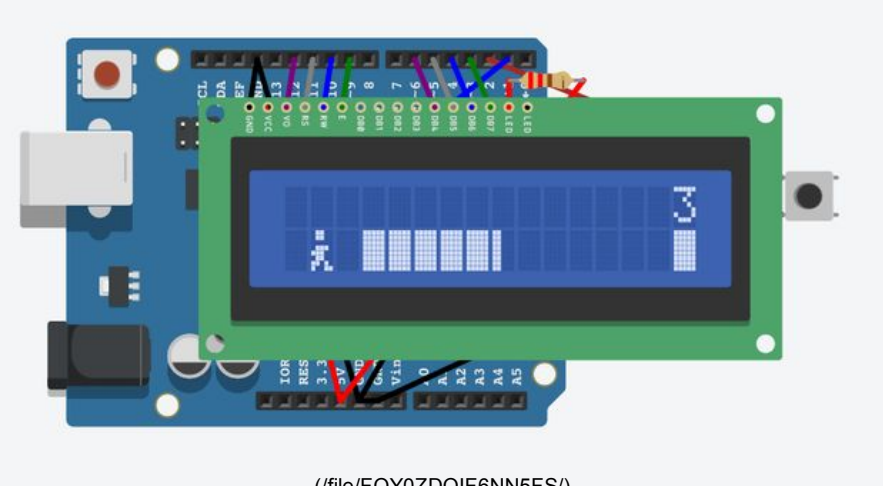
At this point, the screen of the LCD display should light up.

Program the Arduino by selecting File → Upload (or press the right arrow button at the top of the Arduino software).

If all goes well, the LCD screen should now show the game start screen like in the picture above.

LCD_Game.ino (/files/orig/F05/WE4K/IG11YTGV/F05WE4KIG11YTGV.ino)

Step 3: Changing things and making an Arduino game shield



At this point you have everything working, so what more is there to do?

If you want to change the way the game works, or make a cool printed circuit board for this project that plugs directly onto the Arduino and replaces of all those messy wires, here's how to get started.

I developed this game entirely using the very cool (FREE!) online electronics simulator 123D Circuits (https://123d.circuits.io/?utm_source=instructables&utm_medium=instructable&utm_content=arduino-lcd-game&utm_campaign=arduino-lcd-game). I actually had the game fully working and tested before ever taking the Arduino out of the kit. Here's the virtual circuit for the Arduino LCD game (https://123d.circuits.io/circuits/1023084-arduino-lcd-game#breadboard?utm_source=instructables&utm_medium=instructable&utm_content=arduino-lcd-game&utm_campaign=arduino-lcd-game).

AUTODESK **CIRCUITS** View on Autodesk Circuits

Arduino LCD Game by joshua.brooks (/member/joshua.brooks/)

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You can actually play the game right in your browser without ever having to put together any actual electronics ("Oh, now you tell me"). If you want to make any changes to the game, or explore what's going on, you can copy the virtual circuit using the "Duplicate Project" button. You can then edit the source code and try out changes right there. There's also a full-featured debugger where you can step through the program line-by-line and see what's going on!

If you are so inclined, you can also make a circuit board to nicely connect your electronics to the Arduino. The project has a "Download Gerber" button that will get you the files necessary to give to a printed circuit board (PCB) manufacturer to have a custom printed circuit board made. You can see what this PCB look like by clicking the "PCB View" button toward the upper right of the circuit. Here's some useful info on getting that PCB made (https://support.circuits.io/hc/en-us/articles/205848878).

Enjoy!

be nice We have a be nice comment policy. Please be positive and constructive.

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cliptwings (/member/cliptwings) made it! a month ago Reply

Thanks so much for developing this project. I used it and modified it for a geocache I just placed. Once the finder gets at least 50 points, the LCD displays the coordinates for the final stage of the cache.

Run, Geocacher, Run!.MOV
(http://www.instructables.com/files/orig/FXJ/9O4N/IOLU8GGN/FXJ9O4NIOLU8GGN.mov)

joshua.brooks (/member/joshua.brooks) (author) ▸ cliptwings (/member/cliptwings) a month ago Reply

That's brilliant!!!!

dadecoza (/member/dadecoza) made it!

3 days ago Reply

...Side scrolling one button jump game for the Ardu

Arduino LCD Game by joshua.brooks (/member/joshua.brooks/)

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Modified the code slightly to use the LCD Keypad Shield - https://goo.gl/uF8z24 (https://goo.gl/uF8z24)

I like how you used an interrupt to detect when the button is pushed. The LCD Keypad Shield uses an analog pin for it's buttons so I were unable to use the interrupt, luckily it did not make the game less responsive as I thought it might.

Well done on a great and very fun game! I think it is the best I have seen for the 16x2 LCD!

(http://cdn.instructables.com/F58/VEMG/IQ6UOF1U/F58VEMGIQ6UOF1U.LARGE.jpg)

tcam41 (/member/tcam41)

14 days ago Reply

got 228

yay!!!!!!!

David_Lin (/member/David_Lin) made it!

a month ago Reply

great !

I make a remote version. :-)

(http://cdn.instructables.com/F35/C4XP/IOKBSYJ2/F35C4XPIOKBSYJ2.LARGE.jpg)

MarekC5 (/member/MarekC5) made it!

4 months ago Reply

Thanks for code I am from Czech republic and I am 13
I add 2 potentiometers 1st for contrast and 2nd for game speed
It is incredible

Thanks
Can you please write another code for arduino?

Arduino LCD Game by joshua.brooks (/member/joshua.brooks/)

GustavoR56 (/member/GustavoR56) ▸ MarekC5 (/member/MarekC5) Reply

3 months ago

Hi, could you publish where it goes the potentiometer for the game speed?
Amazing game

MarekC5 (/member/MarekC5) ▸ GustavoR56 (/member/GustavoR56) Reply

3 months ago

For speed, i put 10k potentiometr to pin A0 and in the end of code where is delay i chenged delay to delay(analogRead(A0)÷2)

GustavoR56 (/member/GustavoR56) ▸ MarekC5 (/member/MarekC5) Reply

2 months ago

hi, I try but i Can´t
could you public the scheme please

joshua.brooks (/member/joshua.brooks) (author) ▸ MarekC5 (/member/MarekC5)

4 months ago Reply

Fantastic! Good job. I'll try to come up with another good Arduino project. Thanks for the encouragement.

Aumb3 (/member/Aumb3) ▸ joshua.brooks (/member/joshua.brooks) Reply

2 months ago

Hello ,, i want some helps with the codes how i will define them

Aumb3 (/member/Aumb3) ▸ MarekC5 (/member/MarekC5) 2 months ago Reply

Hello ,, can uu send for me the code that you use it .. Thanks

gogoguy (/member/gogoguy) 3 months ago Reply

I got 91

lukecorcoran (/member/lukecorcoran) ▸ gogoguy (/member/gogoguy) Reply

2 months ago

i got 104

HaythamL (/member/HaythamL) 2 months ago Reply

hhh im kinda sad its amazing but i dont get the code so much stuff in it does any one here indrestand it and want to teach me?? my facebook is " haytham ltifi" xd send me an invitaion with a msg because i dont accept random people you have all my thanks

Tanmay Deuskar (/member/Tanmay Deuskar) 3 months ago Reply

Amazing project!!

igortekno (/member/igortekno) 3 months ago Reply

I've loved this. As some others I've added a potentiometer for the contrast.
One question, what is the resistor for? I've tried with and without it (in the previous project I've done I used just a wire for that)
It's been my second project with a LCD for learning how does it work.
Thank you for this, really interesting and helpful!!

joshua.brooks (/member/joshua.brooks) (author) ▸ igortekno (/member/igortekno) 3 months ago Reply

The resistor is for the LED backlight. LEDs require a resistor to limit the current running through them. It may be that newer modules include a built-in resistor for the backlight LED so that it doesn't have to be externally added. I do know that older LCD modules do not have this resistor built-in. If a module has a built-in resistor, having this second, external one won't hurt, it just might make the display a bit dimmer that it would otherwise be.

gogoguy (/member/gogoguy) 3 months ago Reply

Made it! My 6 yr old sister loves it!

khuongpro (/member/khuongpro) 3 months ago Reply

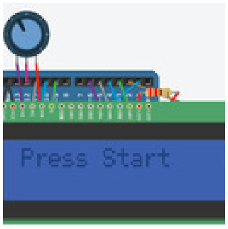
Thanks for your share. great!!. i will do this project. You are awesome :))

XehanortA (/member/XehanortA) 4 months ago Reply

Hello, how do I fit the contrast? You might put a scheme pliss

joshua.brooks (/member/joshua.brooks) (author) ▸ XehanortA (/member/XehanortA) 4 months ago Reply

Replace the wire between Arduino digital pin 12 and the LCD screen terminal V0 with a 10K potentiometer The wiper (center pin) connects to V0, one side of the potentiometer connects to digital pin 12 (or GND), and the other one connects to +5V on the Arduino. The potentiometer can then be used to directly adjust the screen contrast.



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XehanortA (/member/XehanortA) ▸ joshua.brooks (/member/joshua.brooks) 4 months ago Reply

thank :D , now is perfect !! wuoooo

XehanortA (/member/XehanortA) ▸ joshua.brooks (/member/joshua.brooks) 4 months ago Reply

thank :D , now is perfect !! wuoooo

MarekC5 (/member/MarekC5) 4 months ago Reply

Can I use 4x20 lcd display without any changes in the code or I must make changes?

Thanks

Arduino LCD Game by joshua.brooks (/member/joshua.brooks/)

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noviceprogrammer (/member/noviceprogrammer) 5 months ago Reply

Hello sir, I really like your project and I was hoping you could help me with a problem I am having with it. I have checked my wire connections and I am fairly positive they are correct. The issue I am having is that whenever I connect my Arduino up to my computer to use as a power source it does not turn on but when I remove the ground connection from the Arduino to the breadboard it turns the Arduino on. If you could help me that would be great and if you need me to post a picture of my circuit I can.

joshua.brooks (/member/joshua.brooks) (author) ▸ noviceprogrammer (/member/noviceprogrammer) 5 months ago Reply

My guess is that there is a short somewhere in your circuit. What you are experiencing suggests that the positive supply +5V or +3.3V from the Arduino is somehow connected directly to ground. You can test this with a continuity tester (multimeter) when the circuit is connected, but not powered (not connected to the computer). Test the continuity from +5V to GND.

Wessinc (/member/Wessinc) 5 months ago Reply

Cool and very easy to build! Thanks!

raihanmg38 (/member/raihanmg38) 5 months ago Reply

hello sir, i wanna ask how to made it of we use i2c backpack?

joshua.brooks (/member/joshua.brooks) (author) ▸ raihanmg38 (/member/raihanmg38) 5 months ago Reply

I've never worked with the backpack. Here's how I would approach this problem, though. You would need to find the appropriate code library and replace the function calls in my code that write to the LCD with the equivalent ones from the backpack library.

SNS_RYANG (/member/SNS_RYANG) made it! 6 months ago Reply

hello sir im ryan greetings from indonesia im the senior high school student in Mekatronika Class(Electronics mechanic) :)
Look this project is complete now and i made it and the game works
can you make another LCD Game like racing game or fighting maybe and good job make more update for this game like this aah when your scores is very high and you still survive the speed of the obstacle is faster faster and faster and please make another update and a new LCD game okay mate :D

(http://cdn.instructables.com/FUV/BP1N/IJHJQLGB/FUVBP1NIJHJQLGB.LARGE.jpg)

Arduino LCD Game

by joshua.brooks (/member/joshua.brooks/)

joshua.brooks (/member/joshua.brooks) (author) ▸ SNS_RYANG (/member/SNS_RYANG) 6 months ago Reply

I'm happy that you made this and the project worked well for you! If you want to have the game speed up as the score increases, you could change the Arduino code to have the value of the delay() call at the end of the loop() function decrease as the score goes up.

SNS_RYANG (/member/SNS_RYANG) ▸ SNS_RYANG (/member/SNS_RYANG) 6 months ago Reply

eeh sorry i don't using the blue LCD well the blue LCD make me see the sprites better but that's only what i have the Green LCD

extremeus (/member/extremeus) 6 months ago Reply

great project!

extremeus (/member/extremeus) 6 months ago Reply

great project!

chrisminheere (/member/chrisminheere) made it! 6 months ago Reply

geweldig' ik heb hem ook gemaakt en het spel is gewoon verslavend

(http://cdn.instructables.com/FG5/EJI9/IJ3745QS/FG5EJI9IJ3745QS.LARGE.jpg)

joshua.brooks (/member/joshua.brooks) (author) ▸ chrisminheere (/member/chrisminheere) 6 months ago Reply

Fantastisch! Ik ben erg blij te horen dat je het leuk vindt!

MalavikaS (/member/MalavikaS) 8 months ago Reply

good <3

mladenj (/member/mladenj) made it! 8 months ago Reply

very nice, 123Dcircuits also :)
thank you

(http://cdn.instructables.com/FF1/IM9U/IGHVAL2B/FF1IM9UIGHVAL2B.LARGE.jpg)

Arduino LCD Game

by joshua.brooks (/member/joshua.brooks/)

joshua.brooks (/member/joshua.brooks) (author) ▸ mladenj (/member/mladenj)
8 months ago Reply

Beautiful! I like the front panel.

cgrrty (/member/cgrrty) 9 months ago Reply

Amazing ,ad a sound is beter for the game .

Raphango (/member/Raphango) 9 months ago Reply

Great! Congrats!!

Lizette AnneP (/member/Lizette AnneP) 9 months ago Reply

how can i get the code ?

joshua.brooks (/member/joshua.brooks) (author) ▸ Lizette AnneP (/member/Lizette AnneP) 9 months ago Reply

It can be found here:

LCD_Game.ino (http://www.instructables.com/files/orig/FL5/V50S/IF6NNJ2U/FL5V50SIF6NNJ2U.ino).

mvan beurden (/member/mvan beurden) 9 months ago Reply

Use longer hookup wires to make the remainder of the connections:

Connect DB7 to Arduino pin 3
Connect DB6 to Arduino pin 4 <----------
Connect DB5 to Arduino pin 5
Connect DB6 to Arduino pin 6 <----------
Connect E to Arduino pin 9
Connect R/W to Arduino pin 10 (or to black row at top of breadboard)
Connect RS to Arduino pin 11
Connect V0 to Arduino pin 12 (or to black row at top of breadboard)
Plug the pushbutton somewhere to the left of the LCD screen, straddling the channel running along the center of the breadboard (see picture above).

There is two times DB6 i think you mean DB4 the second time

joshua.brooks (/member/joshua.brooks) (author) ▸ mvan beurden (/member/mvan beurden) 9 months ago Reply

Thanks for catching the duplicate DB6. You are right. I fixed it in the instructions.

chienline (/member/chienline) 9 months ago Reply

Wicked Cool Project. Simple and intuitive game for kids to get rid of their tablets for a while :D

MikeZ9 (/member/MikeZ9) 9 months ago Reply

Why would the screen light on, but the game not load. I have uploaded it, but the game does not load.

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joshua.brooks (/member/joshua.brooks) (author) ▸ MikeZ9 (/member/MikeZ9) 9 months ago Reply

The screen lights as soon as the backlight has power. This means that you have the resistor and two LED pins (two rightmost pins when looking at the front) of the LCD screen connected properly.
As for the game not displaying, this could represent a problem with any of the other connections to the LCD. I'd recommend double (or triple) checking each of the other connections to make sure that they are connected correctly.

bk-bear (/member/bk-bear) 9 months ago Reply

Simple fun cool and nostalgic

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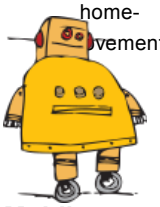

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