AGH UNIVERSITY OF SCIENCE AND TECHNOLOGY

Project documentation

Dice game

from the subject

Microprocessor Technology 2

Electronics & Telecommunications 3 year

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Group Wednesday 8.00

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1. Project description

The goal of the project was to create a dice game. One of the main elements was the creation of a pseudorandom number generator in the range from 1 to 6. The game consists of three rolls, after each roll we can decide which dice to keep and which to roll again.

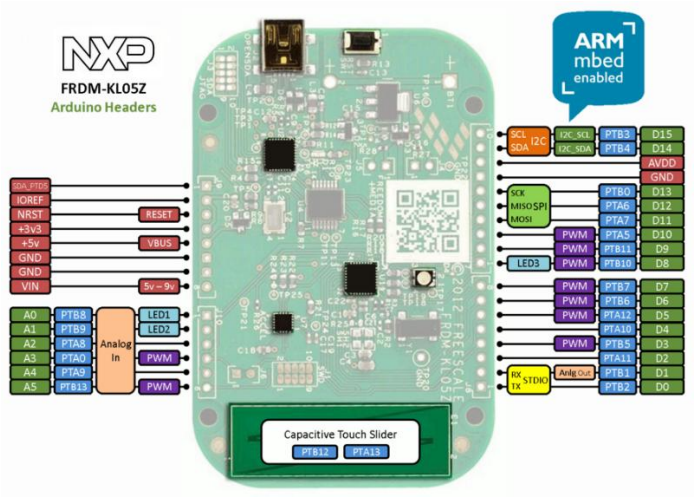
2. Elements used

I. FRDM-KL05Z Microcontroller

II. LCD-1602 Display

III. Matrix keyboard

3. Wiring



LCD Display 1602	
SDA	PTB4
SCL	PTB3
VIN	5V
GND	GND
Matrix keyboard	
C1	PTA12
C2	PTA11
C3	PTA10
C4	PTA7
R4	GND

The S1 button was connected to a different pin than in the lab to access the fourth interrupt.

4. Libraries used

I. i2c.h

II. klaw.h

III. LCD1602.H

IV. frdm_bsp.h

5. Gameplay description

The game starts by asking the player to press the S1 button to begin. The gameplay consists of 3 rounds (rolls). In the first one, we roll all five dice. In order to roll the dice, click S4. After the first and second rolls, we have the opportunity to decide which dice we want to roll again and which we want to save for the next round. Using the S2 button, the player can move the selection cursor (an arrow displayed under the dice) to highlight different dice. Pressing S3 will select a die (it will start flashing). After selecting the dice to reroll, pressing S4 again will roll only the selected (flashing) dice.

After the end of our turn (our 3 rounds), it is the bot's turn. We can observe its automatic gameplay. Finally, the sums of the player's and bot's dice are compared. After the comparison, we get a notification on the display "you won", "you lost" or "draw" depending on the outcome of the game. Once the game is over, we have the option to start the next one by clicking S1.

In order to end our turn and start the bot's turn, we also press the S4 key

6. Generator

To draw the values of the rolled dice, I created the function of a congruent pseudorandom number generator. As a seed, I used the value read from an analog-to-digital converter that processes noise. This ensures that every game is different even after the program reset.