AGH

# Microprocessor Technology II

**Faculty of Computer Science, Electronics and Telecommunications**

"Blackjack card game project" report by Seweryn Dumania and Tomasz Lejkowski

## 1. Introduction

The aim of this project was to design a blackjack card game on the Kinetis FRDM-KL05Z Board. Using the skills acquired during the course we were able to write a fully functional program in pure C programming language.

## 2. Requirements

- Hardware:
  - Personal computer or laptop
  - FRDM-KL05Z evaluation board
  - LCD display
  - external keyboard

- Software:
  - Some serial communication software (i.e. Putty, Termite, Realterm)
  - Keil uVision5 for board programming

## 3. Mechanics of the game

The first thing that needs to be done is the correct connection of the LCD Display and the external keyboard to the board. The buttons that are used on the keyboard are buttons S1 and S5 connected to PORTB pins 6 and 7 respectively. The LCD Display is used to show the cards that players have on their hand, UART communication is used for the control of the flow of the game, as well as the visualization of the Dealer hand and the keyboard is used for the choices that the players can make, which are HIT(draw another card from the deck) on button S1 and STAND(end player's turn) on button S5.

## 4. Flow of the game

In this point an example round will be explained step by step. After loading the program to the board, there will be a message displayed on the serial communication software of choice asking to specify Player's 1 and Player's 2 bets. The user can specify those numbers by using the send buffer with +LR function that any of the popular serial communication software definitely has. After specifying the bets, the first card for the Dealer, and two cards for each of the players are rolled from the deck. The cards obtained by the players can be seen on the LCD Display. Now that the players know their cards, as well as the first cards of the dealer they can make their decision to STAND, or to HIT using

the buttons on the keyboard. When the player's sum of values of cards exceeds 21, or the button responsible for the choice of STAND is pressed, the player's turn ends. When both players turn end, the other cards for the dealer are drawn from the deck until the summed up value of the Dealer's cards is minimum 17, then depending on the summed up values of the other players the program decides if someone won, or lost. Also such basic rules of Blackjack, like drawing an ace to a hand that will be lost by adding a value of 11 to it, or the instant win by getting a Blackjack at the start of the game, are implemented in the program. When the Dealer or a player draws an ace, and the summed value of the previous cards with that ace exceeds 21, the ace value is treated not as 11, but as 1. Which might give a player a second chance.

## 5. Conclusions

Creating such a project gave us a lot of insight into the world of microprocessor programming. We improved our C language programming skills by a lot, and also learned a lot of new things.

In the uVision project we can find cards.c and cards.h which are main files with game mechanics code. There we can find functions for events, and also see a data struct of the game.