An-Najah National University
Faculty of Engineering and IT

جامعة النجاح الوطنية
كلية الهندسة وتكنولوجيا المعلومات

Computer Engineering Department
Course Name: Microprocessor Lab Number: 10636392
Lab Report Grading Sheet

Instructor: Dr. Aladdin Masri	Experiment #: 1
Academic Year: 2019/2020	Experiment Name: Binary Input/Output
Semester: Summer Semester	

Students	
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Report's Outcomes

ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %	ILO __ =( ) %

Evaluation Criterion	Grade	Points
Abstract answers of the questions: "What did you do? How did you do it? What did you find?"	0.5	
Introduction and Theory Sufficient, clear and complete statement of objectives. In addition to Presents sufficiently the theoretical basis.	1.5	
Apparatus/ Procedure Apparatus sufficiently described to enable another experimenter to identify the equipment needed to conduct the experiment.Procedure sufficiently described.	2	
Experimental Results and Discussion (In-Lab Worksheet) Crisp explanation of experimental results. Comparison of theoretical predictions to experimental results, including discussion of accuracy and error analysis in some cases.	4	
Conclusions and Recommendations Conclusions summarize the major findings from the experimental results with adequate specificity. Recommendations appropriate in light of conclusions. Correct grammar.	1	
Appearance Title page is complete, page numbers applied, content is well organized, correct spelling, fonts are consistent, good visual appeal.	1	
Total	10	

Abstract:

In this experiment, we are going to use the 8255 provided by the MML8086K3 training board to read the state of 8 switches, and output the read pattern on a set of 8 LEDs.

Objectives:

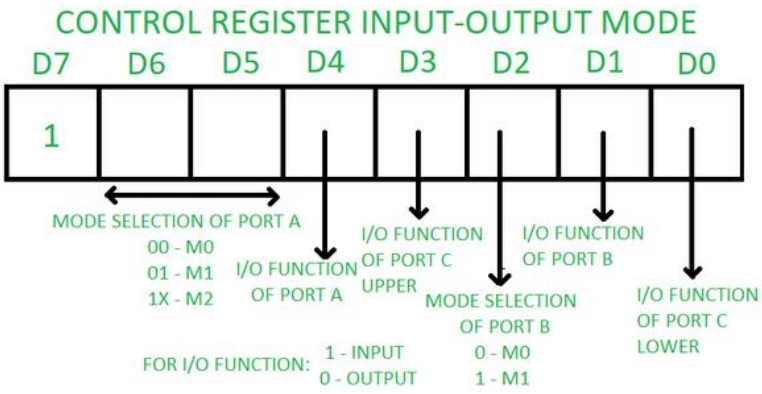
- To be familiar with the MML8086K3 training board.
- To be familiar with the 8255 PPI.
- Implementing a basic I/O function using the assembly language

Procedure:

The 8255 PPI (Programmable Peripheral Interface) is a programmable logic device that is widely used to interface the CPU with external components. The first step to this experiment is to understand how the 8255 works.

The 8255 PPI has three 8 bi-directional input/output ports denoted as Port A, B and C, where each port can be set to be either an input port or an output port.

Before we can use the 8255, we need to configure it to match our needs.



As we can see, we can configure the 8255 PPI by sending a set of binary values to the control word register.

Procedure: *(cont.)*

- The most significant bit D7 specifies the mode the 8255 is going to use. If the value is 0, that means it is going to work in the Bit Set/Reset mode, and if the value was 1, that means it is going to work in the input/output mode, which is our mode for this experiment.
- The bits D6 and D5 represent the mode that the port A is going to work in. We are going to use mode 00 as this mode is going to make our port behave as a simple input/output port.
- The bit D4 represents the input/output functionality of port A. We are going to set this value to 0 as we are going to use this port to output the read pattern from the switches to the LEDs.
- The bit D3 represents the input/output functionality of port C (Upper). Since we are not going to use port C at all, we will simply put the value to 0 to behave as an output (if we set it to 1, it will act as a floating pin).
- The bit D2 represents the mode that the port B is going to work in. Simply as port A, we will set this value to 0 as this mode is going to make port act as a simple input/output port.
- The bit D1 represents the input/output functionality of port B. We are going to set this value to 1 as we are going to use this port to monitor the state of the switches on the board.
- The bit D0 represents the input/output functionality of port C (Lower). Just like the upper bits of port C, this will be set to 0 as we will not be using it.

Our final set of bits that is going to be sent to the control word register is going to be “10000010”, or simply, 82h.

After determining the configuration command, we need to send the command to the control word register address. The training board has a fixed address for each port A, B, and C, in addition to a fixed address for the control register:

Register	**Address**
Control word register	0FF2BH
PORT A	0FF28H
PORT B	0FF29H
PORT C	0FF2AH

We will be using these addresses to communicate with the 8255 PPI.

Procedure: *(cont.)*

Our first lines of code will be like this:

```
1  MOV DX, 0FF2BH
2  MOV AL, 82H
3  OUT DX, AL
```

Now the 8255 PPI is going to infinitely use port B to read input, and port A to output some value.

The next step is to simply wire both of port B with the switches and port A with the LEDs.

Lastly, we will need to keep reading the values from the switches and output the same values without any changes to the LEDs.

```
4  LOOP:
5  MOV DX, 0FF29H
6  IN AL, DX
7  MOV DX, 0FF28H
8  OUT DX, AL
9  JMP LOOP
```

Conclusion:

In the end, we learned how to use the 8255 to implement a basic input/output functionality using some switches and some LEDs provided by the training kit. Additionally, we learned how to communicate with the microprocessor practically using the assembly language.