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DIGITAL LOGIC – SECR1013

PROJECT A

GROUP 4

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Table Of Content:

No	TITLE	PAGE
1	Project Idea	2
2	Components	2-3
3	Block Diagram	3
4	Extra Features	4-7
5	Conclusion	7

Project Idea:

The application and implementation of combinational circuits in an ATM machine system controller is discussed in this project. The project will determine the user's input, the method of execution, and the system's overall output. This project intends to increase the efficiency of the ATM machine's system and create a safer and more user-friendly process for the user.

Components:

Encoder:

Encoder converts decimal to BCD for the purposes of calculations to be performed in the sequences to follow. It takes each decimal digit and converts it into a 4 binary bit number.

Comparator:

Comparator compares binary values to determine whether the values are equal, lower or higher compared to the other. The input from user and the other input from the database would be compared this way.

Adders:

Adder performs binary addition. 4-bit parallel Adders are used, with Exor gate in full circuit configuration, which accept input bits from database and user data, and subtract to give binary output.

Decoder:

Decoder would perform the function of converting BCD to 7 segment display to display the remaining balance.

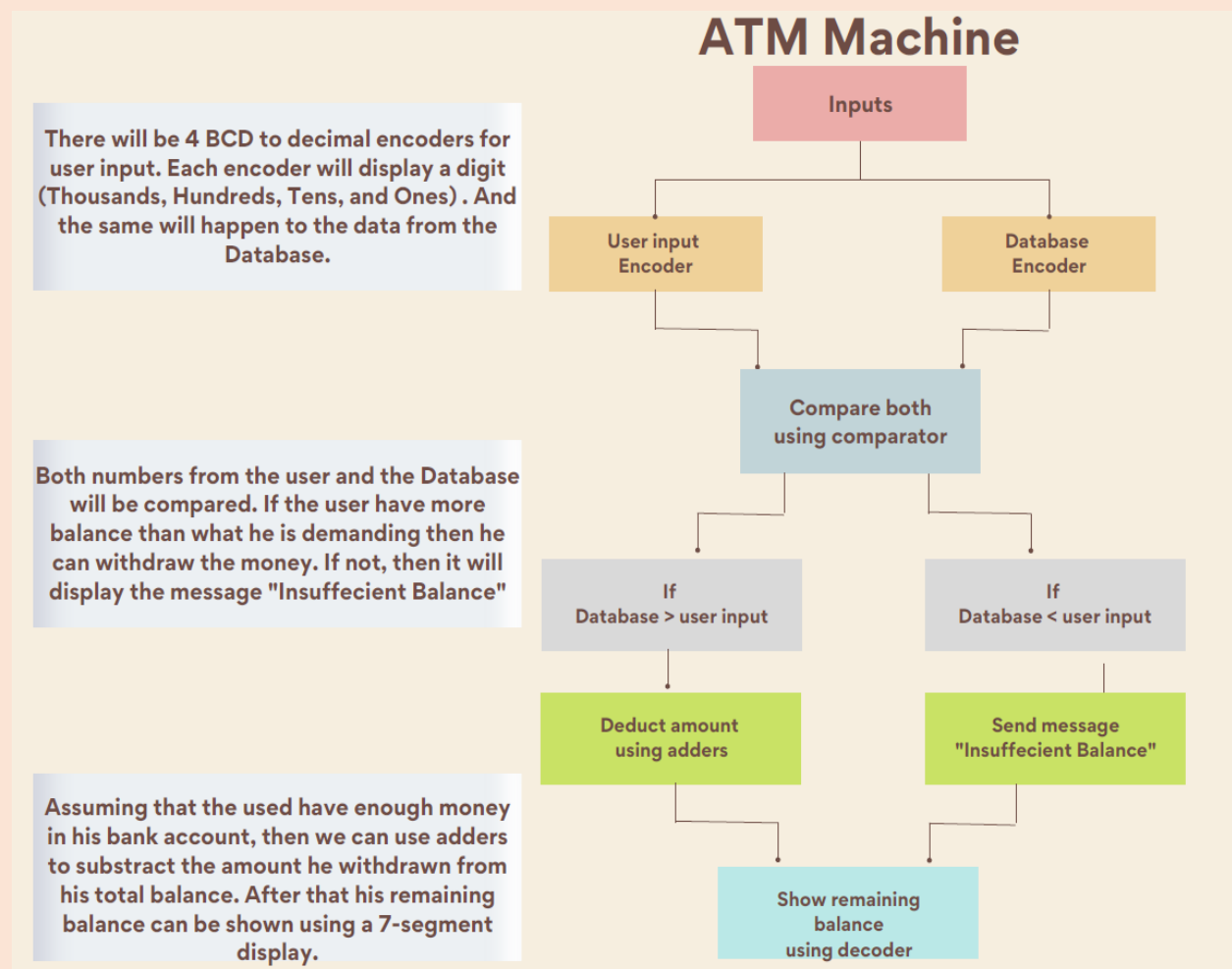
D Flip-Flop:

Used to store a preset PIN number created by the user in binary to be later compared to the user input PIN when using the ATM.

Counters:

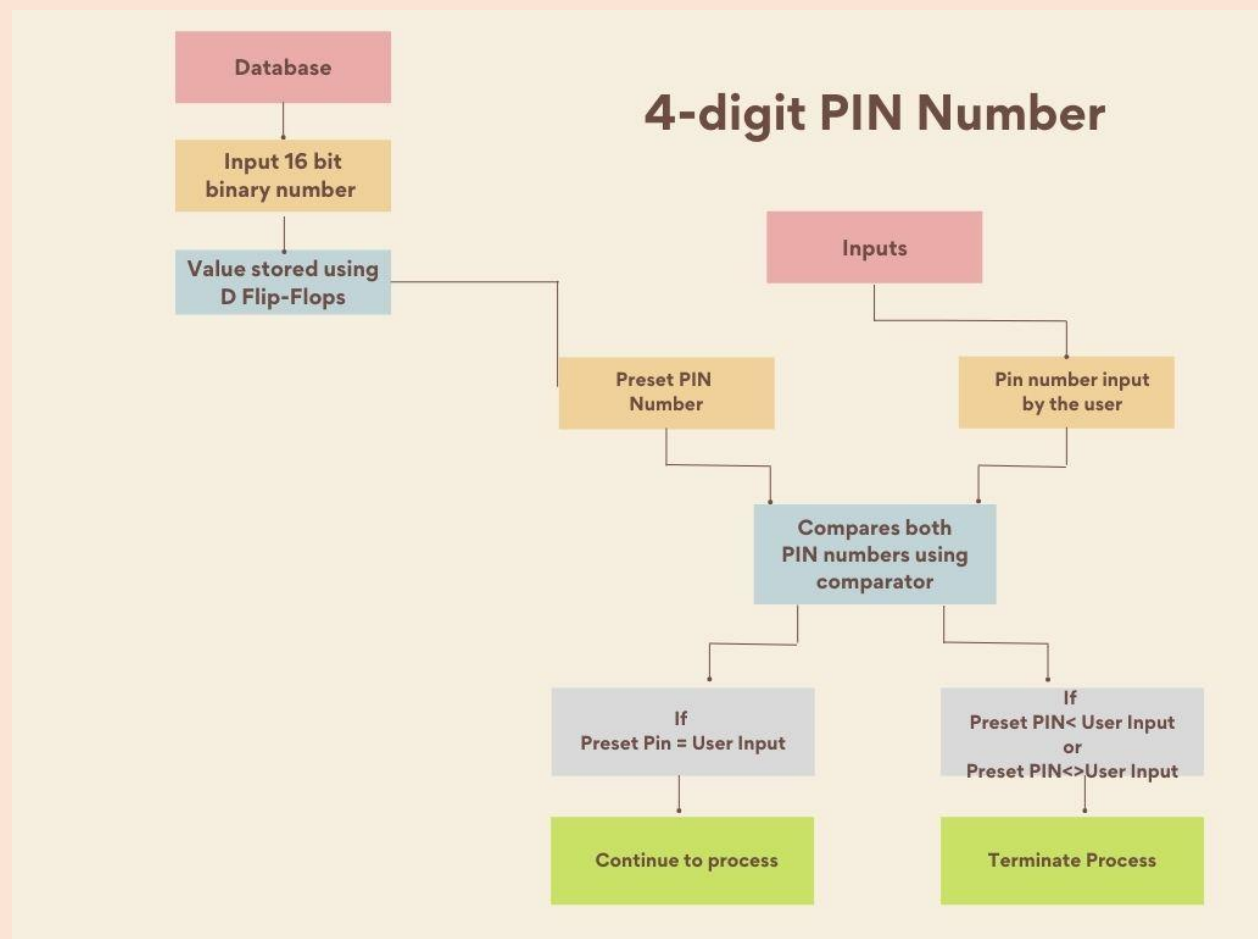
Used to count the number of notes that needs to be printed. Wither it is RM10s notes, RM20s notes, or RM50s notes.

Block Diagram:

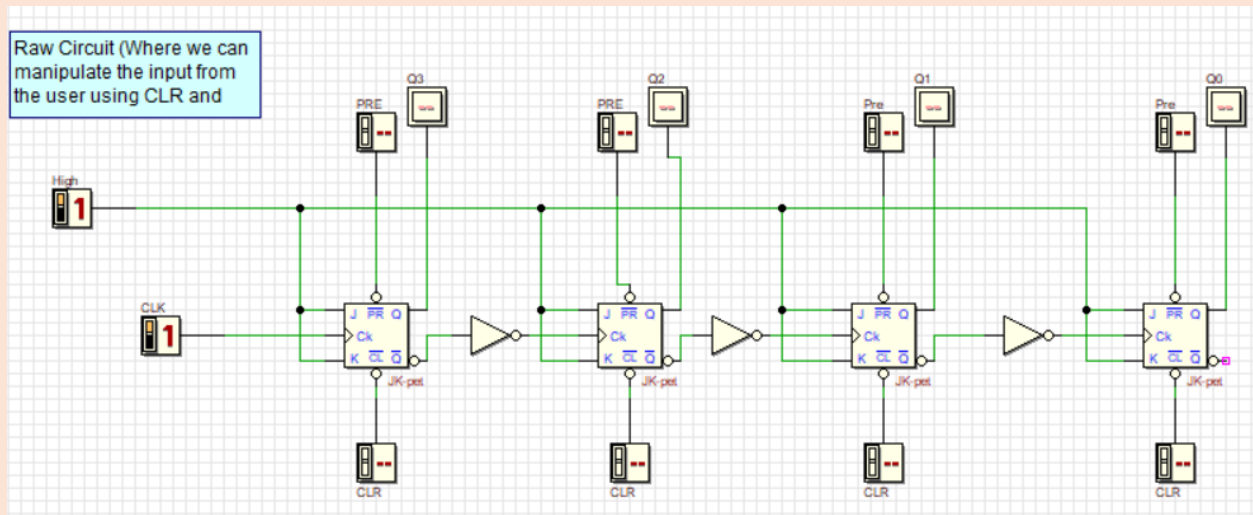


Extra Features:

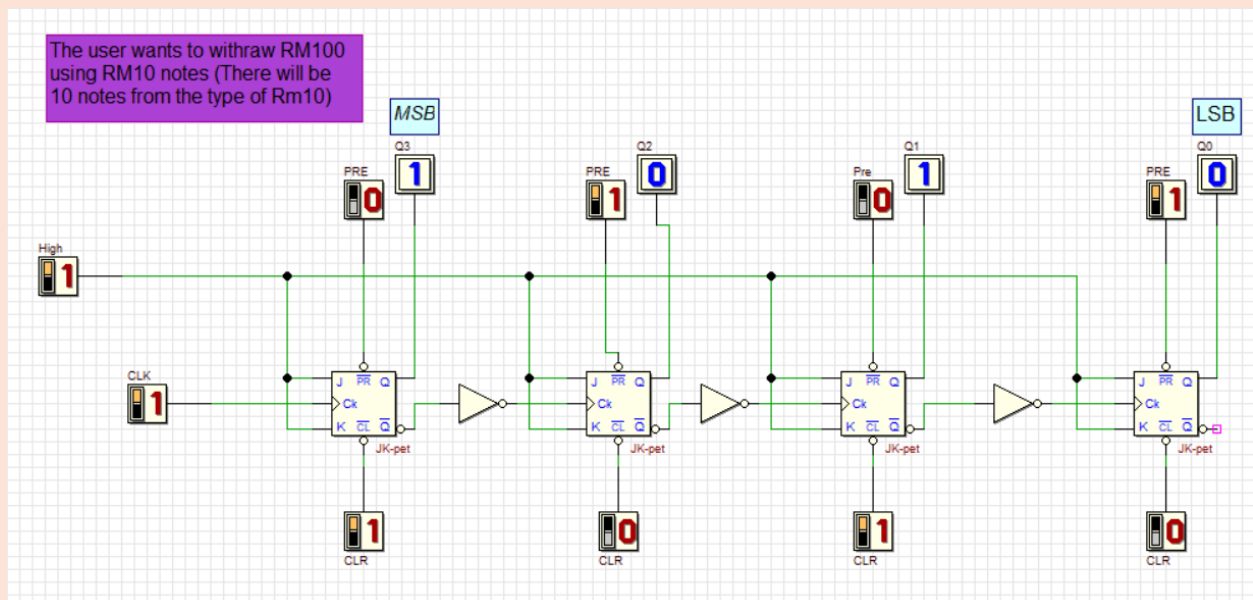
4 Digit PIN: A preset 4-digit pin is stored in a database using 16 D Flip-Flops to store a 16-bit binary number. When the user would like to use the ATM, he/she will input their PIN as decimal numbers, the encoders will convert the decimal numbers to a 16-bit binary number. This number will be compared to the preset PIN stored in the database using a comparator, if the PIN matches the preset one, the process will continue, if not then the process will be terminated.



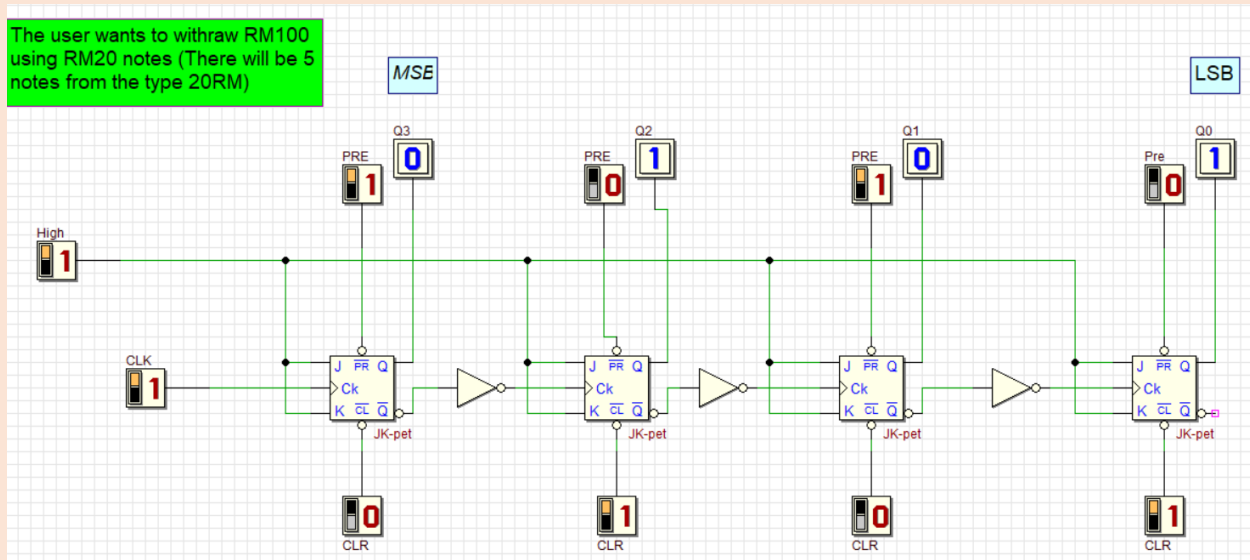
Counters:



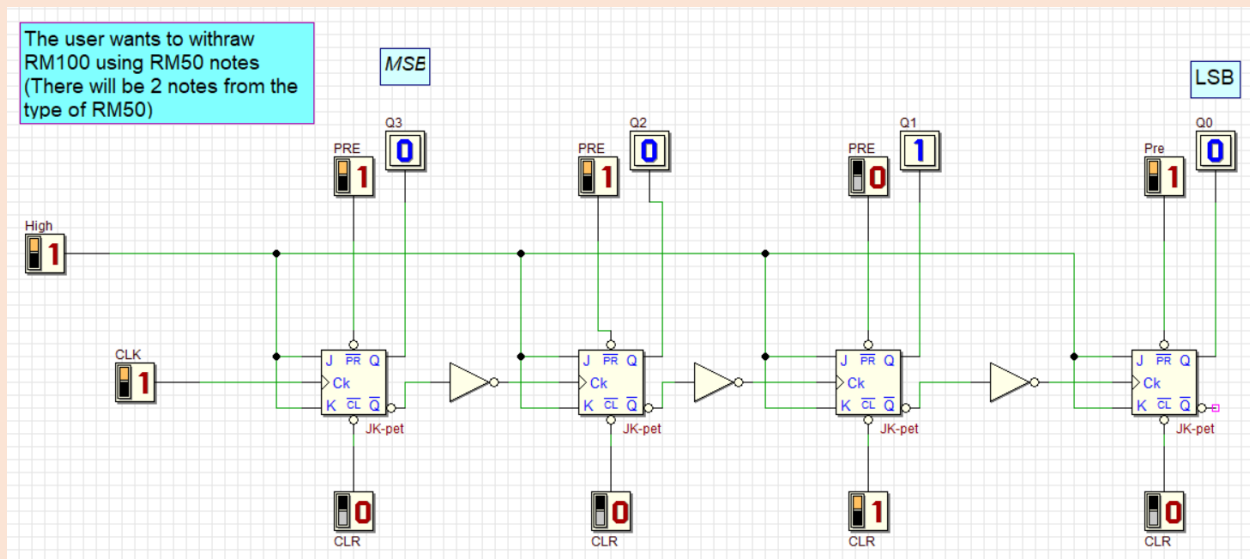
This is the sequential circuit used for manipulating the input from the users by making a counter based on JK flip flops. The most significant bit is Q3, and the least significant bit is Q0.



For visualized example, here the user wants to withdraw 100 ringgits using 10s, which will be 10 notes and this counter circuit's output is 1010 which corresponds to the value of 10 notes. Hence, the counter gives the count of exact number of notes.



Changing configuration using preset and clear function, this circuit now shows the output of 0101(binary) which is 5 notes as needed by the user to withdraw 100 ringgits using 20s.



Again, by changing configuration of preset and clear of the same raw circuit, we can get the exact number of notes needed for the user to withdraw 100 ringgits using 50s. The output is 0010 (binary) which corresponds to the values of 2; the number of notes.

Conclusion:

To remove a 4-digit sum from the user's balance, the project employed a collection of encoders, comparators, adders, decoders, flip-flops, and counters. This was accomplished by comparing the balance stored in the database to the one entered by the user. The system completed the tasks necessary, although it is only capable of accepting 4-digit inputs. Also an extra feature has been added to improve the security of the system.