CALCULATOR

Abstract :

The project is about designing a Calculator using KEIL software. It performs operations like "ADDITION" , "SUBTRACTION" , "DIVISION" , "MULTIPLICATION". It would accept floating values also .

AIM: Implement a Calculator with C – program.

OBJECTIVE :

- **It would perform major operations like ADD, SUB , MUL, DIV .**

PESUDO CODE:

MAX_STRING_LENGTH as 20

rough_str[MAX_STRING_LENGTH]

State structure:

STATE_INIT, STATE_WAIT_INPUT, STATE_PROCESS_INPUT, STATE_EXIT .

Function delay(time):

Implement delay using Timer 0

Function uart_init():

Configure Timer 1, Serial Control Register, and set baud rate(4800)

Enable Timer 1 and wait for initialization

Function transmitted_data(str): // it is a function where total string will transmit.

Transmit each character in str through UART(from trans_data(););

Function trans_data(ch): // it is to transmit one char at a time .

Transmit character ch through UART

Function received_data(): // received data in the form of char.

Wait for and return the received character through UART

Function rec_data(str, length): // received data in the form of string .

   Receive characters until '\r' or '\n' is encountered or length-1 characters are received

Function cal_fun():

   Declare number_1, number_2, choice, and flag

   Transmit calculator menu through UART

   Receive user choice

   Transmit and receive prompt for Number -1, receive and convert to float

   Transmit and receive prompt for Number -2, receive and convert to float

   Perform calculation based on choice

   Transmit result through UART

Function fsm_state():

   Declare curr_state as STATE_INIT

   Loop forever:

     Switch on curr_state

        - If STATE_INIT: Set curr_state to STATE_WAIT_INPUT

        - If STATE_WAIT_INPUT: Call cal_fun() and set curr_state to STATE_WAIT_INPUT

        - If STATE_PROCESS_INPUT or STATE_EXIT: Do nothing (placeholder)

        - Default: Do nothing (placeholder)
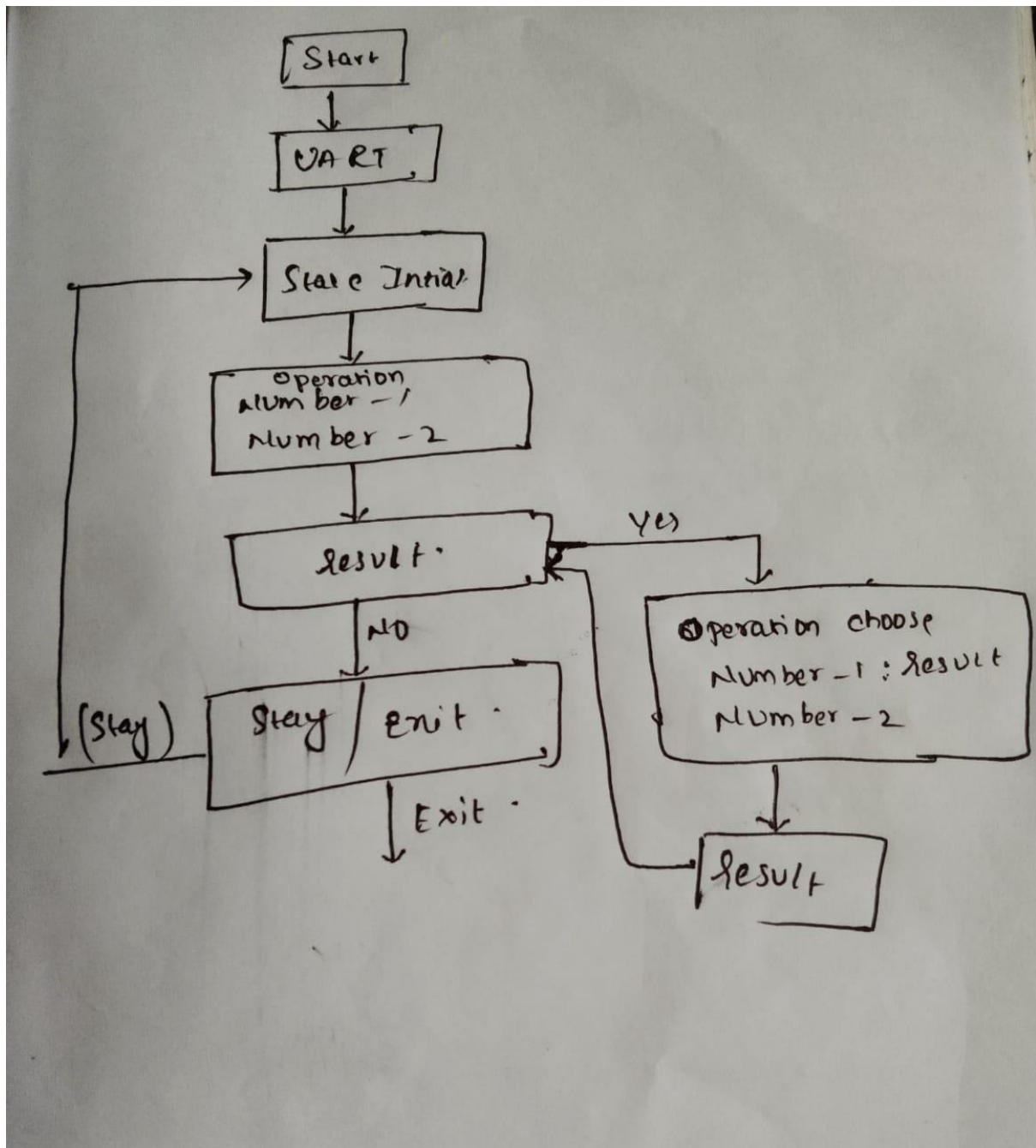

Function main():

   uart_init()

   delay(5)

   fsm_state()

FLOW CHART:

PROCEDURE :

- First compile the code once.
- Then drop the hex file in the Edsim software.
- When you run that you get the operations +,-,\,* .
- (Imp) these are **characters so no need to press enter for next line** or space to transmit the data. So enter your choice.
- (Imp) enter number 1 and **press enter and transmit the number-1** . similarly for number 2 also.
- Then you get the result . After that you get two options 1)continue 2) back

- If you press continue then you can perform operations "on the above result only".
- If you back ,then there are two option 1) restart from first 2) exit.
- Restart from first means code will run from beginning .
- Exit means end.

NOTE : I implement the above code by reffering the real calculator how it works. It works in two ways "1) taking the total string(more operations will perform in a single attempt) at a time and calculate total result ". "2) we can perform as much as operations on the outcome result till we press AC button on it" . so I implement my code on the basis of second one you can implement as many as operations on the outcoming result till you say back.

RESULTS:

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              CALCULATOR

      Oprerations to be Performed ....

      A: ADDITION
      D DIVISION
      M: MULTIPLICATION
      S : SUBTRACTION
Enter Your Choice : A
Number -1 : 12.56
Number - 2: 13.43
Result : 25.99

If You Still Want to Continue (Y|N) ......  : Y
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If You Still Want to Continue (Y|N) ......  : Y
Next operation do you want to perform :
        A: ADDITION
        D DIVISION
        M: MULTIPLICATION
        S : SUBTRACTION
Enter Your Choice : D
Number -1 : Result
Number - 2: 12.6
Result : 2.06
```
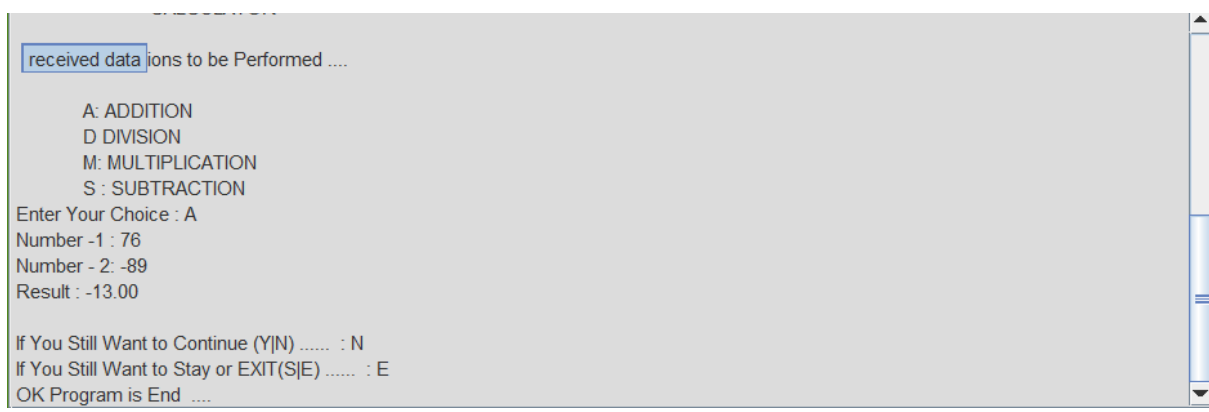
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              CALCULATOR

      Oprerations to be Performed ....

      A: ADDITION
      D DIVISION
      M: MULTIPLICATION
      S : SUBTRACTION
Enter Your Choice : S
Number -1 : -2.05
Number - 2: 45.9
Result : -47.95

If You Still Want to Continue (Y|N) ......  : N
If You Still Want to Stay or EXIT(S|E) ......  : S
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```
If You Still Want to Stay or EXIT(S|E) ......  : S
            CALCULATOR

    Oprerations to be Performed ....

    A: ADDITION
    D DIVISION
    M: MULTIPLICATION
    S : SUBTRACTION
Enter Your Choice : A
Number -1 : 76
Number - 2: -89
Result : -13.00

If You Still Want to Continue (Y|N) ......  : N
If You Still Want to Stay or EXIT(S|E)       : E
```
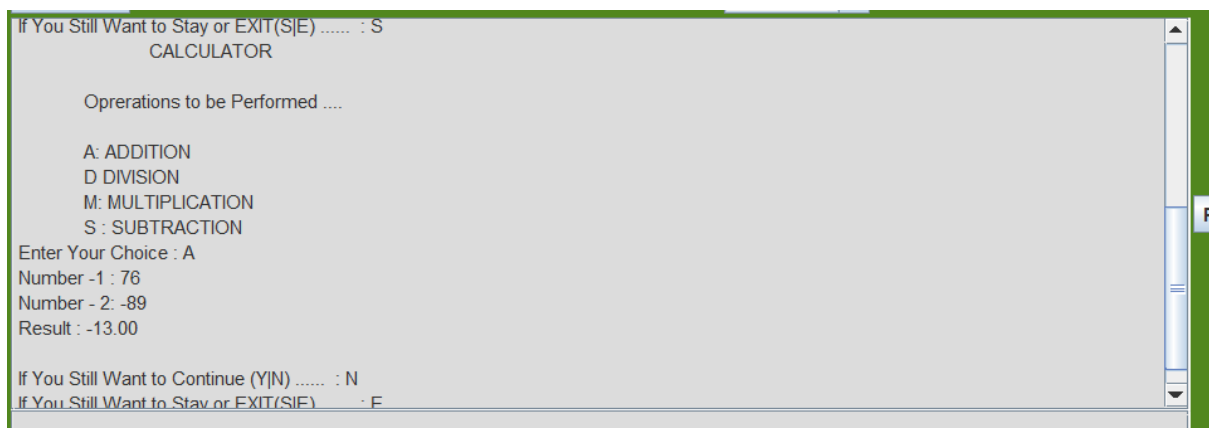
```
received data ions to be Performed ....

    A: ADDITION
    D DIVISION
    M: MULTIPLICATION
    S : SUBTRACTION
Enter Your Choice : A
Number -1 : 76
Number - 2: -89
Result : -13.00

If You Still Want to Continue (Y|N) ......  : N
If You Still Want to Stay or EXIT(S|E) ......  : E
OK Program is End  ....
```

Conclusion : This calculator would able to perform all the operation with floating points also.

Remarks : nothing.

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LAB –> EMBEDDED SYSTEMS

PROJECT –> MINI PROJECT -1