

6-Function ALU Simulation Solution:

.MODEL SMALL

.STACK 100H

.DATA

FIRST_OP_STR DW "Enter 1st operand: \$"

SECOND_OP_STR DW "Enter 2nd operand: \$"

OPR_STR DW "Select the operation: \$"

RES_STR DW "Result: \$"

.CODE

MAIN PROC

MOV AX, @DATA

MOV DS, AX

MOV AH, 9

LEA DX, FIRST_OP_STR

INT 21H

CALL BINARY_INPUT

PUSH BX

MOV AH, 9

LEA DX, SECOND_OP_STR

INT 21H

CALL BINARY_INPUT

PUSH BX

MOV AH, 9

LEA DX, OPR_STR

INT 21H

CALL BINARY_INPUT

MOV CL, BL

POP BX

POP AX

CALL OPERATION

MOV AH, 9

LEA DX, RES_STR

INT 21H

CMP CL , 100b

JE PRINT_DOUBLE_RES

JNE PRINT_SINGLE_RES

PRINT_DOUBLE_RES:

CALL BINARY_OUTPUT

MOV BH, BL

CALL NEWLINE

MOV AH, 9

LEA DX, RES_STR

INT 21H

CALL BINARY_OUTPUT

JMP EXIT

PRINT_SINGLE_RES:

CALL BINARY_OUTPUT

EXIT:

MOV AH, 4CH

INT 21H

MAIN ENDP

NEWLINE PROC

MOV AH, 2

MOV DL, 10

INT 21H

MOV DL, 13

INT 21H

RET

NEWLINE ENDP

BINARY_INPUT PROC

XOR BH, BH

XOR BL, BL

MOV CX, 8

READ_LOOP:

MOV AH, 1

INT 21H

CMP AL, 13

JE END_LOOP

SHL BL, 1

CMP AL, '1'

JE SET_ONE

CMP AL, '0'

JE CONTINUE

JMP READ_LOOP

SET_ONE:

OR BL, 1

CONTINUE:

LOOP READ_LOOP

END_LOOP:

CALL NEWLINE

RET

BINARY_INPUT ENDP

OPERATION PROC

CMP CL, 0b

JE ADD_LABEL

CMP CL, 1b

JE SUB_LABEL

CMP CL, 10b

JE AND_LABEL

CMP CL, 11b

JE OR_LABEL

CMP CL, 100b

JE NOT_LABEL

CMP CL, 101b

JE XOR_LABEL

ADD_LABEL:

ADD AL, BL

MOV BH, AL

JMP E_

SUB_LABEL:

SUB AL, BL

MOV BH, AL

JMP E_

AND_LABEL:

AND AL, BL

MOV BH, AL

JMP E_

OR_LABEL:

OR AL, BL

MOV BH, AL

JMP E_

NOT_LABEL:

NOT AL

MOV BH, AL

NOT BL

JMP E_

XOR_LABEL:

XOR AL, BL

MOV BH, AL

E_:

RET

OPERATION ENDP

BINARY_OUTPUT PROC

MOV CX, 8

PRINT:

SHL BH, 1

JC ONE

JNC ZERO

ONE:

MOV AH, 2

MOV DL, '1'

INT 21H

JMP LOOP_LABEL

ZERO:

MOV AH, 2

MOV DL, '0'

INT 21H

LOOP_LABEL:

LOOP PRINT

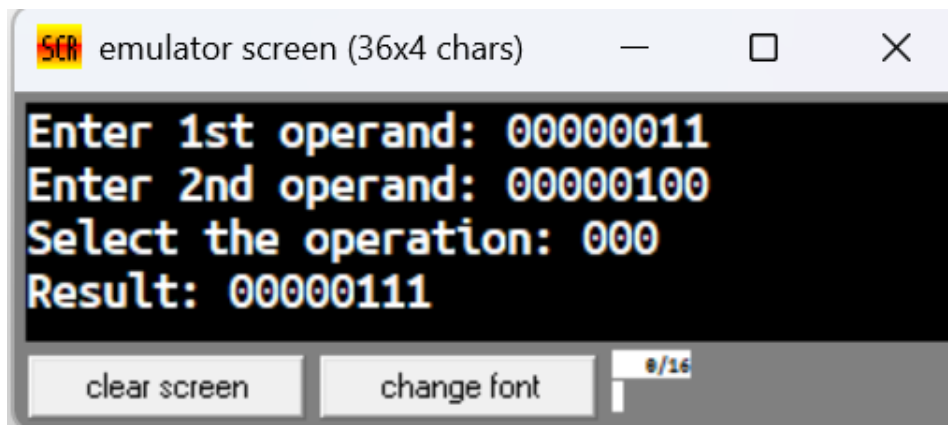
RET

BINARY_OUTPUT ENDP

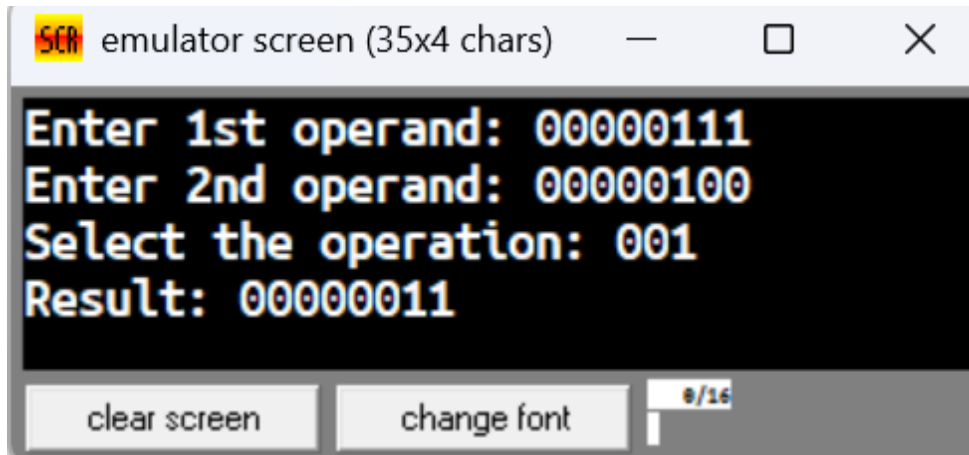
END MAIN

Output:

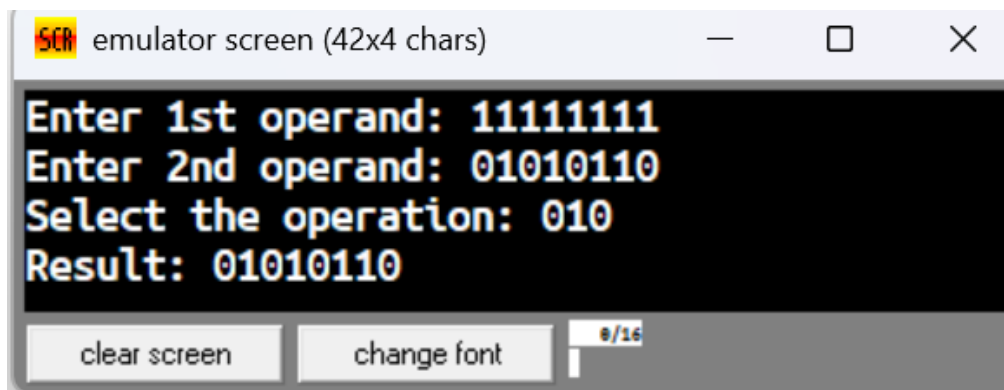
ADD (000b):



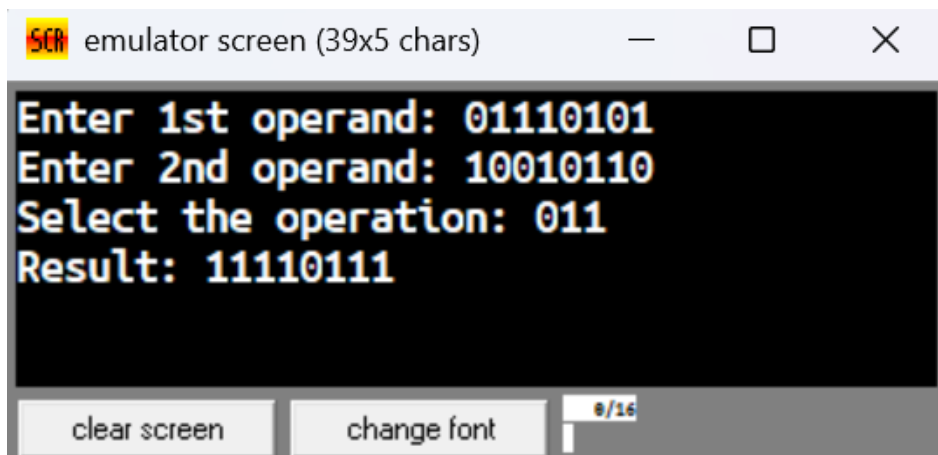
SUB (001b):



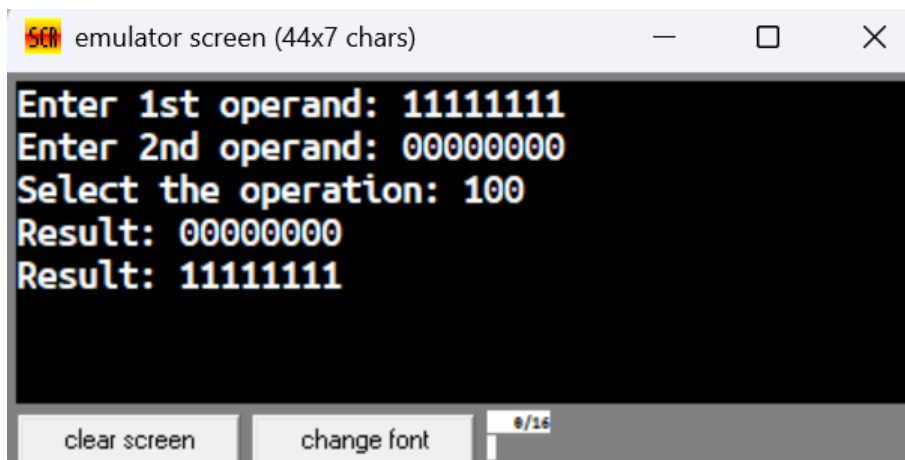
AND (010b):



OR (011b):



NOT (100b):



XOR (101b):

