Microprocessor Lab Exam Report

Rwithik Manoj, Roll No: 53, TVE17CS054

Problem

Identify prime numbers from a given array.

Example: Input: 1,2,3,4,5,6,7,8,9,10
output:1,2,3,5,7

Code

```
; Rwithik Manoj
; Roll No: 53
; TVE17CS054
; Identify prime numbers in an array

DATA SEGMENT
    ARR DB 1,2,3,4,5,6,7,8,9,10
    RESULT DB 20 DUP 10 (?)
    N DB 10
DATA ENDS

CODE SEGMENT
    ASSUME CS:CODE, DS:DATA
    START:
      MOV AX,DATA
      MOV DS,AX
      LEA SI,ARR            ; Move the address of the first element of the array to SI
      LEA DI,RESULT         ; Set DI to the starting address of the result
      MOV CL,N              ; Set CL to the number of elements, N

      MOV DX,0000H
      MOV AH,00H
      LP0:
      DEC CL                ; Decrement CL
      MOV AL,[SI]           ; Move the next number to be checked to AL
      MOV BL,02H            ; Set BL to 2
      MOV BH,00H            ; Clear BH. BH store the number of divisors greater than 1
      CMP AL,02H            ; If the number is less than 2, goto lebel PRIME
      JLE PRIME

      LP1:
        DIV BL              ; Divide AL by BL
        CMP AH,00H          ; Compare the remainder
        JNE NEXT            ; If remainder is not zero, goto lable NEXT
        INC BH              ; Else increment BH
        NEXT:
          CMP BH,01H        ; If BH >= 1, then the number is not prime.
          JE NONPRIME
          INC BL            ; Otherwise, increment BL to the next number
          MOV DX,0000H
          MOV AH,00H
          MOV AL,[SI]       ; Reset AL to the original number, AL was overwritten during div
          CMP BL,AL         ; If BL is less than AL, do the inner loop again.
          JNE LP1
       PRIME:
          MOV [DI],AL       ; If the number is prime, store it in the results array, and inc
          INC DI
       NONPRIME:
         INC SI             ; Increment SI either way
         CMP CL,0
         JNE LP0            ; If CL is greater than zero, do the outer loop again
   MOV AH,4CH
   INT 21H
CODE ENDS
END START
```

Input 1

1, 2, 3, 4, 5, 6, 7, 8, 9, 10

Output 1

1, 2, 3, 5, 7

Input 2

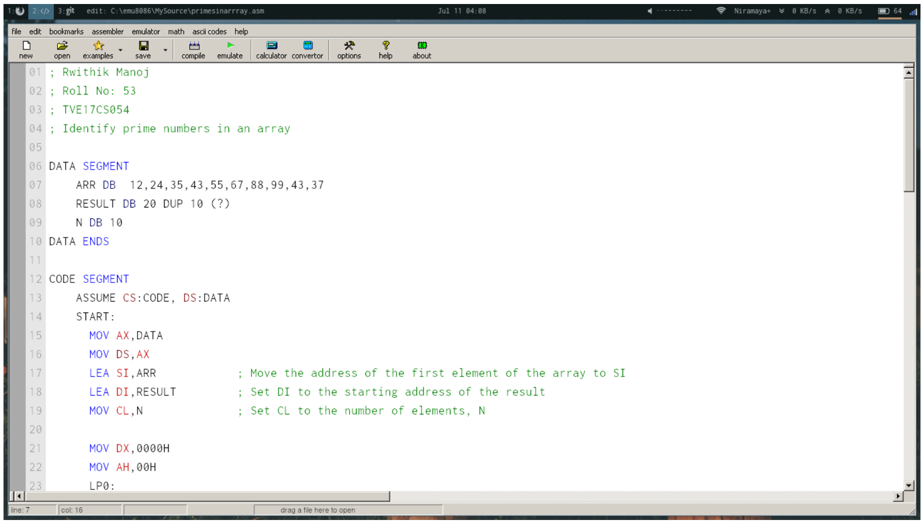
12, 24, 35, 43, 55, 67, 88, 99, 44, 37

Output 2

43, 67, 37

Screenshots

Code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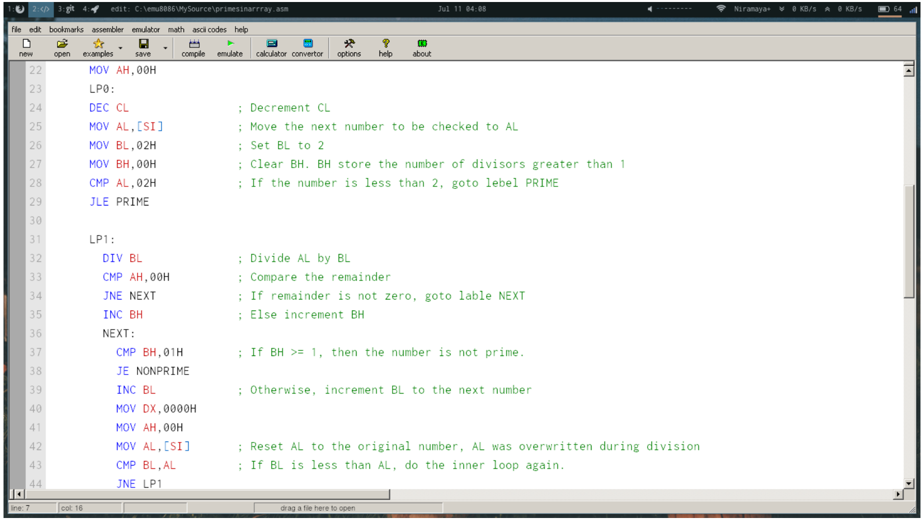
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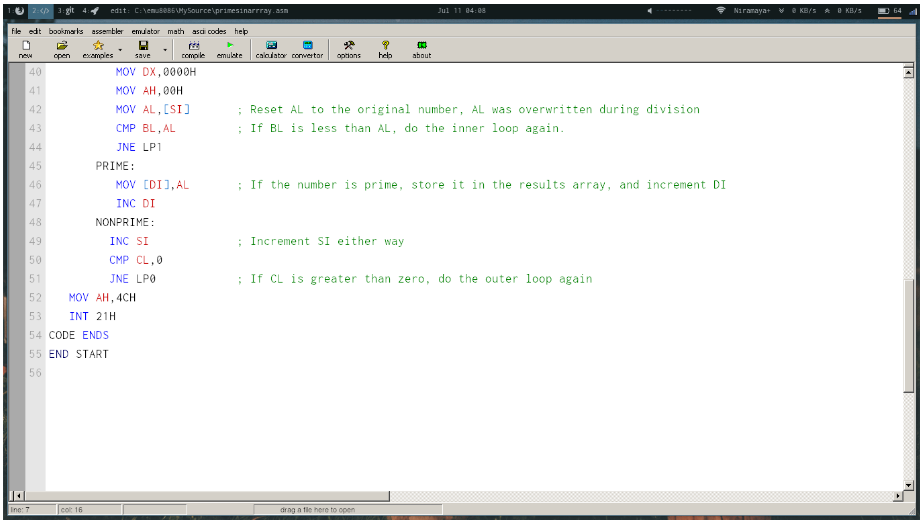
          CMP BL,AL           ; If BL is less than AL, do the inner loop again.
          JNE LP1
```



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          MOV [DI],AL                 ; If the number is prime, store it in the results array, and increment DI
          INC DI
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         CMP CL,0
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   MOV AH,4CH
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CODE ENDS
END START
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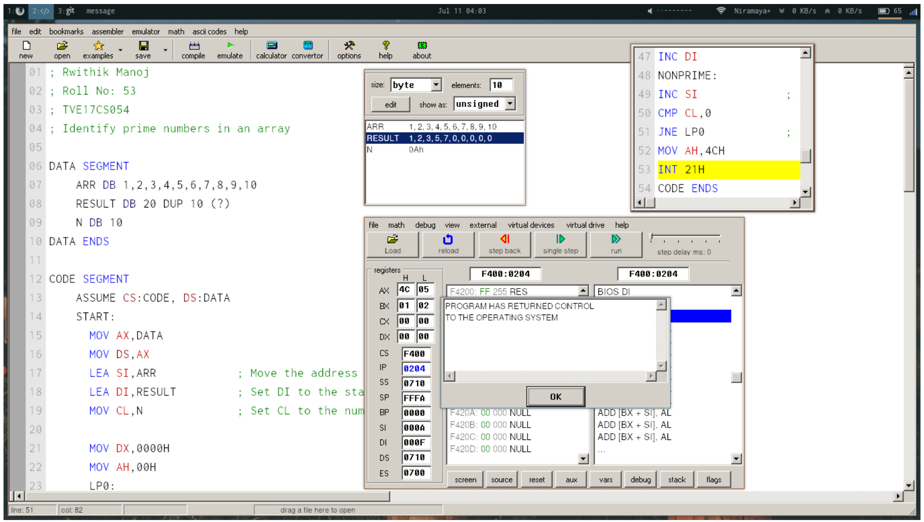
Inputs/Outputs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Load reload step back single step run
step delay ms: 0
registers
screen source reset aux vars debug stack flags
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      MOV DX,0000H
      MOV AH,00H
      LP0:
```

```
INC DI
NONPRIME:
INC SI              ;
CMP CL,0
JNE LP0             ;
MOV AH,4CH
INT 21H
CODE ENDS
```

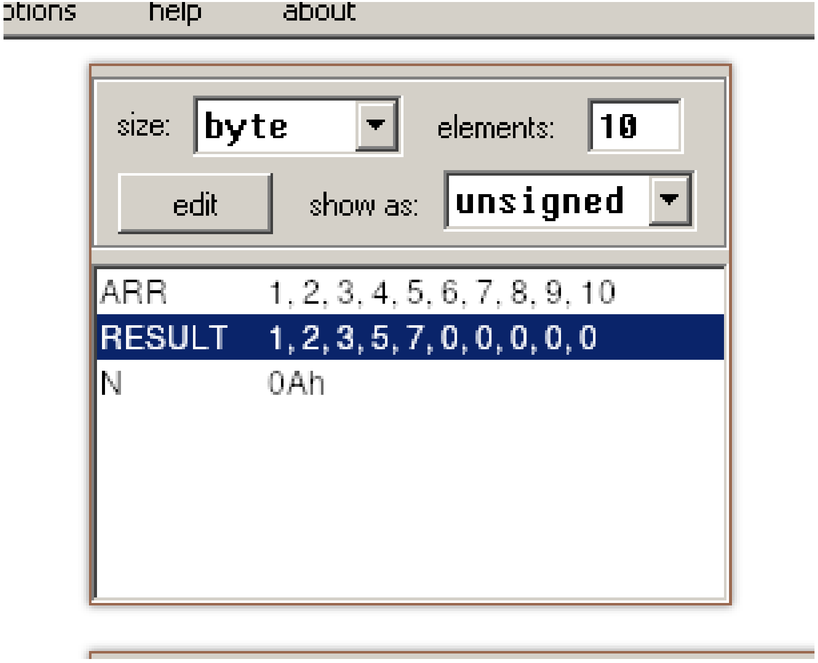
size: byte elements: 10
edit show as: unsigned

```
ARR       1, 2, 3, 4, 5, 6, 7, 8, 9, 10
RESULT    1,2,3,5,7,0,0,0,0,0
N         0Ah
```

	H	L
AX	4C	05
BX	01	02
CX	00	00
DX	00	00
CS	F400	
IP	0204	
SS	0710	
SP	FFFA	
BP	0000	
SI	000A	
DI	000F	
DS	0710	
ES	0700	

```
F400:0204                      F400:0204
F4200: FF 255 RES              BIOS DI
F420A: 00 000 NULL             ADD [BX + SI], AL
F420B: 00 000 NULL             ADD [BX + SI], AL
F420C: 00 000 NULL             ADD [BX + SI], AL
F420D: 00 000 NULL             ...
```

```
PROGRAM HAS RETURNED CONTROL
TO THE OPERATING SYSTEM
```



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ARR       1, 2, 3, 4, 5, 6, 7, 8, 9, 10
RESULT    1,2,3,5,7,0,0,0,0,0
N         0Ah
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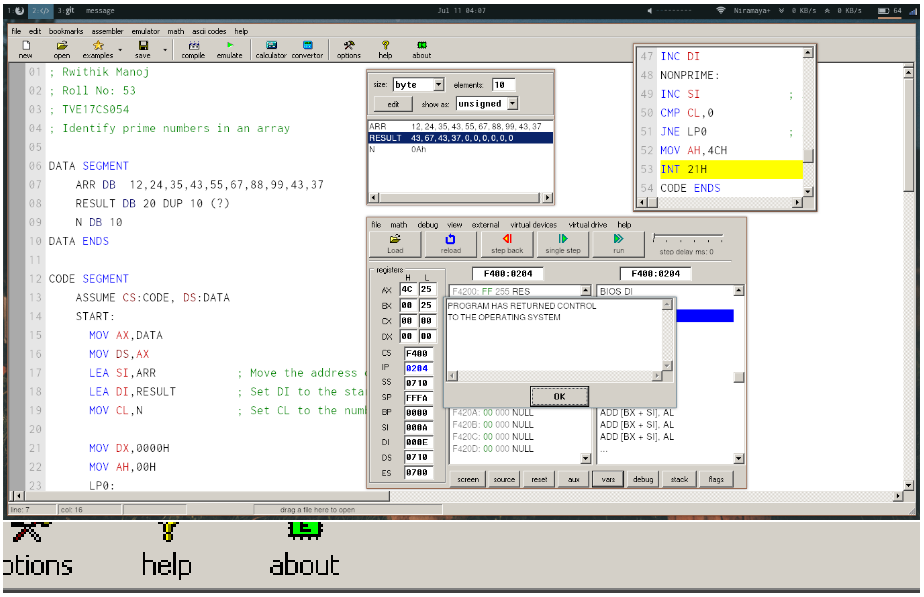
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Load reload step back single step run
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screen source reset aux vars debug stack flags
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      MOV CL,N                ; Set CL to the numb

      MOV DX,0000H
      MOV AH,00H
      LP0:
```

```
INC DI
NONPRIME:
INC SI                       ;
CMP CL,0
JNE LP0                      ;
MOV AH,4CH
INT 21H
CODE ENDS
```

size: byte elements: 10
show as: unsigned

```
ARR      12, 24, 35, 43, 55, 67, 88, 99, 43, 37
RESULT   43, 67, 43, 37, 0, 0, 0, 0, 0, 0
N        0Ah
```

registers

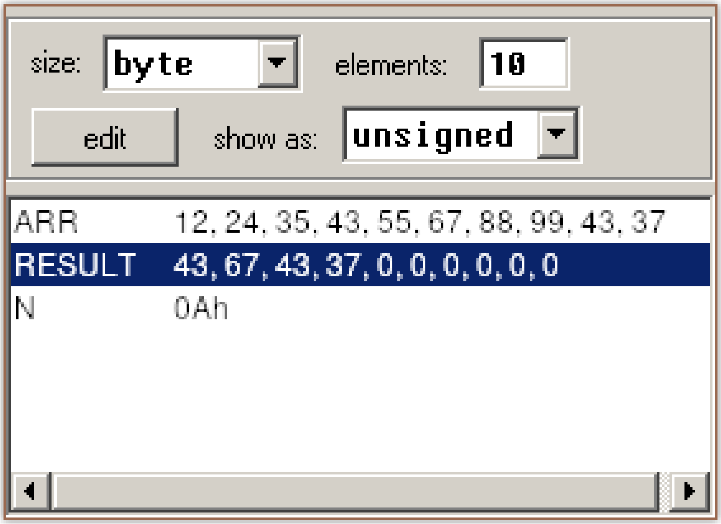
	H	L
AX	4C	25
BX	00	25
CX	00	00
DX	00	00
CS	F400	
IP	0204	
SS	0710	
SP	FFFA	
BP	0000	
SI	000A	
DI	000E	
DS	0710	
ES	0700	

F400:0204 F400:0204

```
F4200: FF 255 RES        BIOS DI
F420A: 00 000 NULL       ADD [BX + SI], AL
F420B: 00 000 NULL       ADD [BX + SI], AL
F420C: 00 000 NULL       ADD [BX + SI], AL
F420D: 00 000 NULL       ...
```

PROGRAM HAS RETURNED CONTROL
TO THE OPERATING SYSTEM

OK



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