

EXPERIMENT--01-ALP-FOR-8086

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› Aim:

To Write and execute ALP on fundamental arithmetic and logical operations

› Components required:

8086 emulator

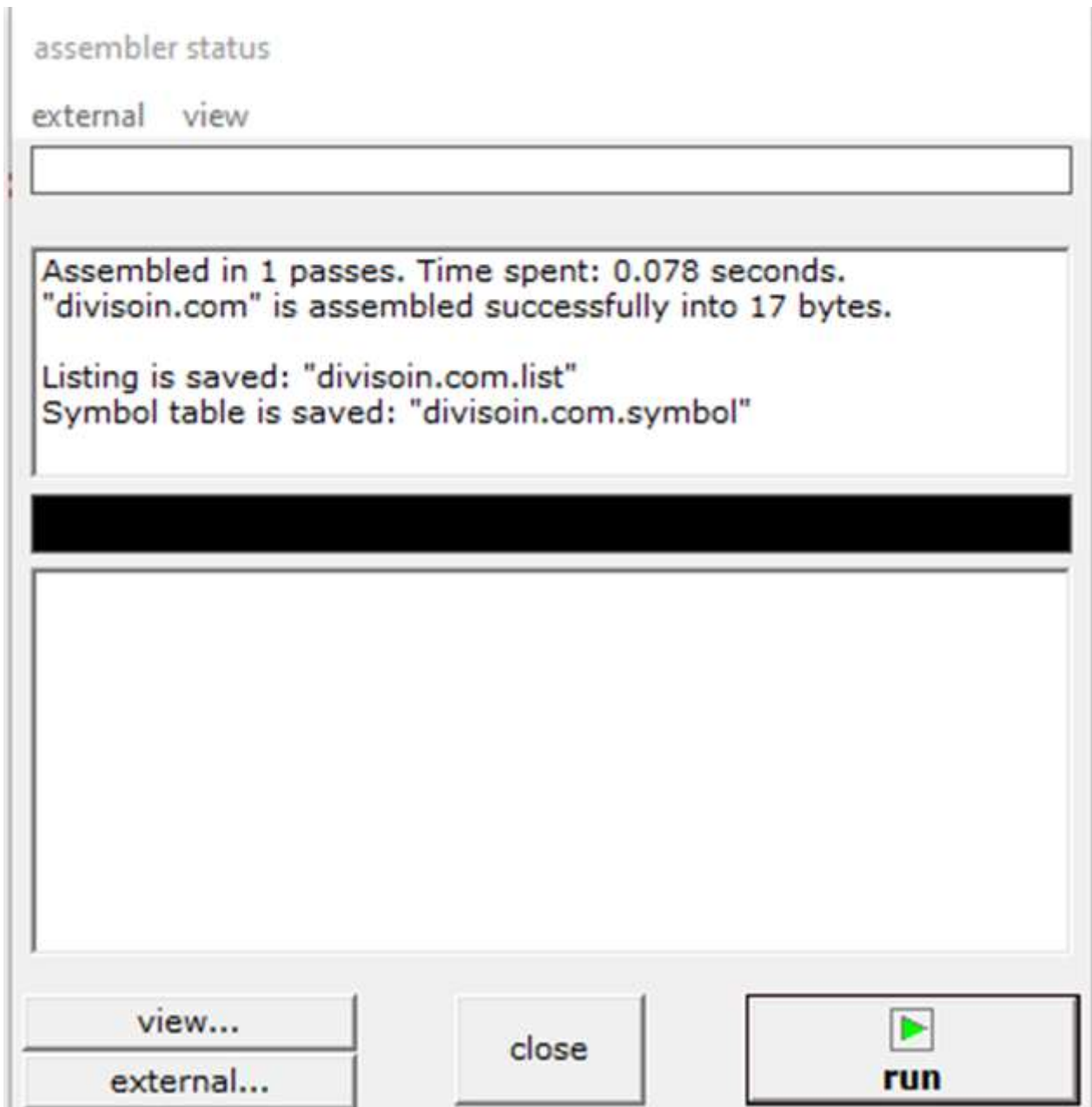
› Theory

Running The Emulator (emu8086) Intro 8086 Microprocessor Emulator, also known as EMU8086, is an emulator of the program 8086 microprocessor. It is developed with a built-in 8086 assembler. This application is able to run programs on both PC desktops and laptops. This tool is primarily designed to copy or emulate hardware. These include the memory of a program, CPU, RAM, input and output devices, and even the display screen. There are instructions to follow when using this emulator. It can be executed into one of the two ways: backward or forward. There are also examples of assembly source code included. With this, it allows the programming of assembly language, reverse engineering, hardware architecture, and creating miniature operating system (OS). The user interface of 8086 Microprocessor Emulator is simple and easy to manage. There are five major buttons with icons and titles included. These are "Load", "Reload", "Step Back", "Single Step", and "Run". Above those buttons is the menu that includes "File", "View", "Virtual Devices", "Virtual Drive", and "Help". Below the buttons is a series of choices that are usually in numbers and codes. At the leftmost part is an area called "Registers" with an indication of either "H" or "L". The other side is divided into two, which enables users to manually reset, debug, flag, etc. What is 8086 emulator emu8086 is an emulator of Intel 8086 (AMD compatible) microprocessor with integrated 8086 assembler and tutorials for beginners. Emulator runs programs like the real microprocessor in step-by-step mode. it shows registers, memory, stack, variables and flags.

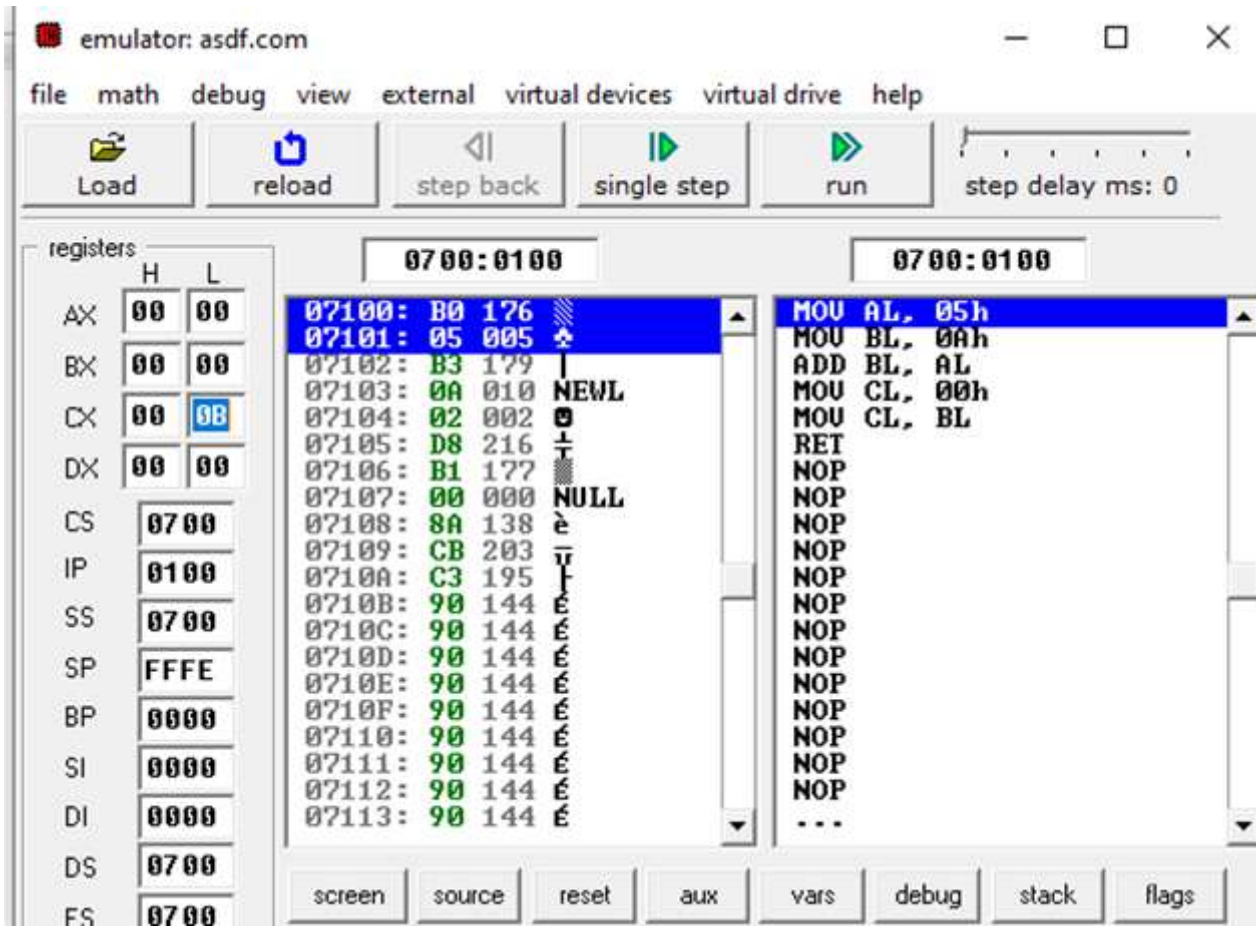
› Running the Emulator :

1. Download and install emu8086 (www.emu8086.com) It is usually installed in C:\EMU8086 subfolder in the "Windows" directory
2. Run emu8086 icon (on the desktop or in the c:\EMU8086 folder of window) It has green color
3. write the code for the appropriate program for ADDITION,SUBTRACTION, MULTIPLICATION, DIVISION operations
4. Compile the program and check for the errors

5. Run (once there is no syntax error)
6. Click OK to see/view the output of your program on the Emulator screen.
7. After running the program, another menu screen will be displayed, where you have the option to "View" symbol table,
- 8.



9. Click on emulate to start emulation



10. If no errors are found click on run the program and check the status of various flags in the flags tab as shown below

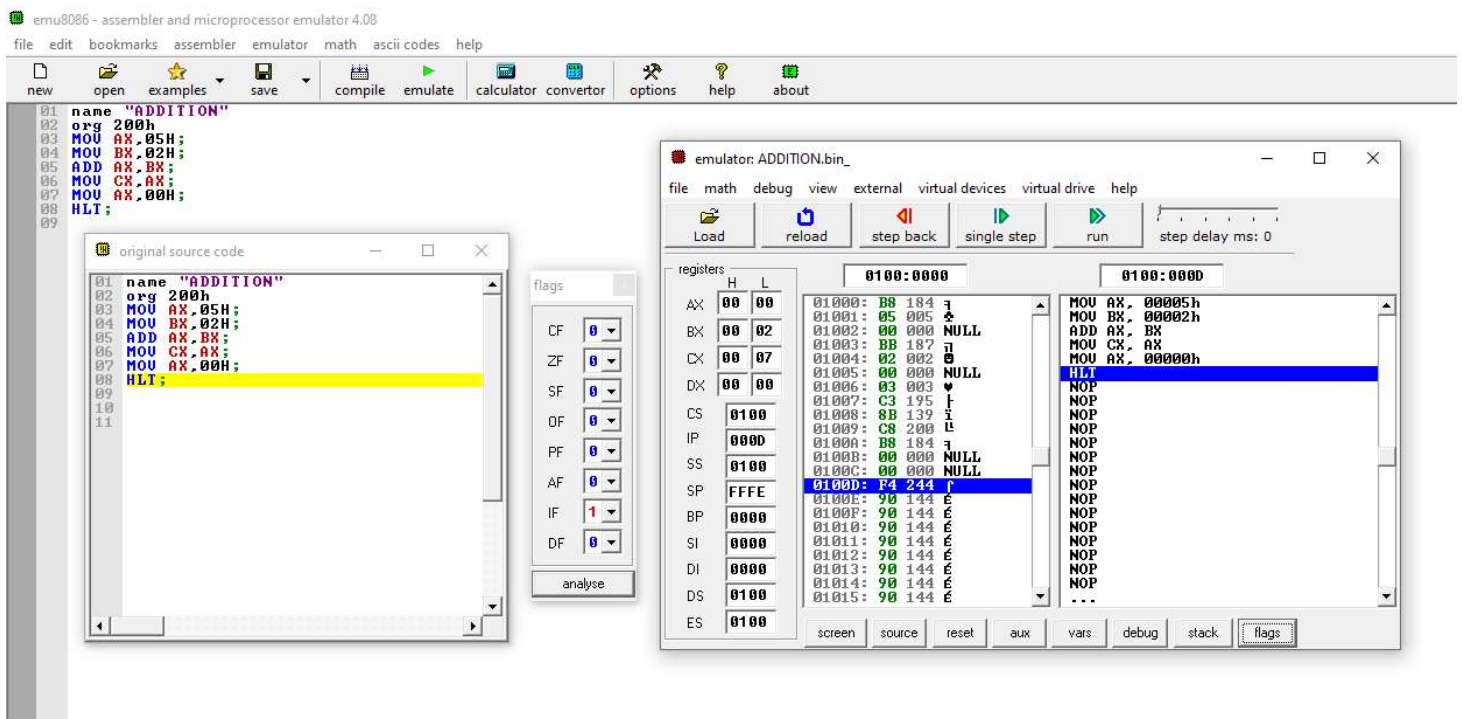


' Programs for arithmetic operations

' Addition of 8 bit ALP

```
name "ADDITION"
org 100h
MOV AH,05H;
MOV BH,02H;
ADD AH,BH;
MOV CH,AH;
MOV AH,00H;
HLT;
```

' Output



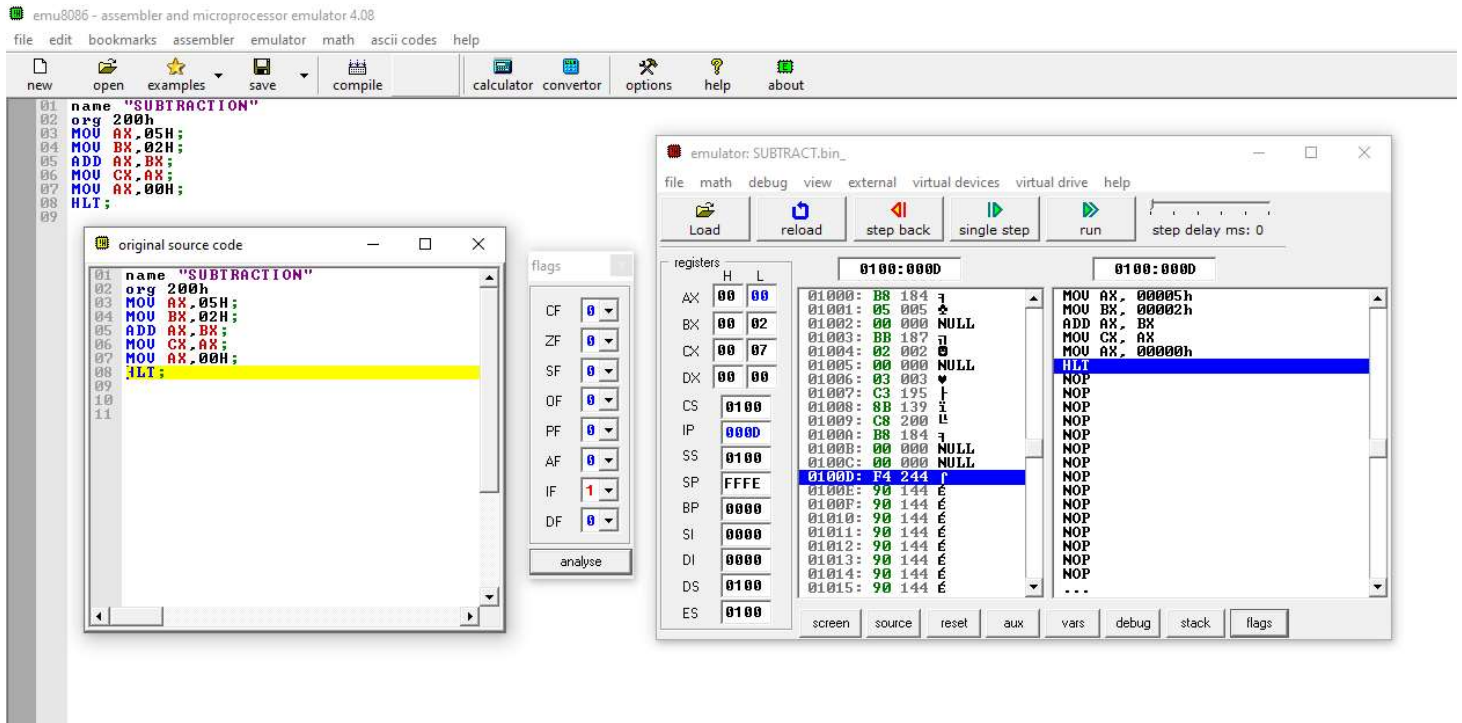
' Subtraction of 8 bit numbers ALP :

```
name "SUBTRACTION"
org 100h
MOV AH,09H;
MOV BH,03H;
SUB AH,BH;
MOV CH,AH;
```

```
MOV AH,00H;
```

```
HLT;
```

' Output



' Multiplication of 8 bit ALP:

```
name "MULTIPLICATION"
```

```
org 700h
```

```
MOV AL,15H;
```

```
MOV BL,03H;
```

```
MUL BL;
```

```
MOV CL,AL;
```

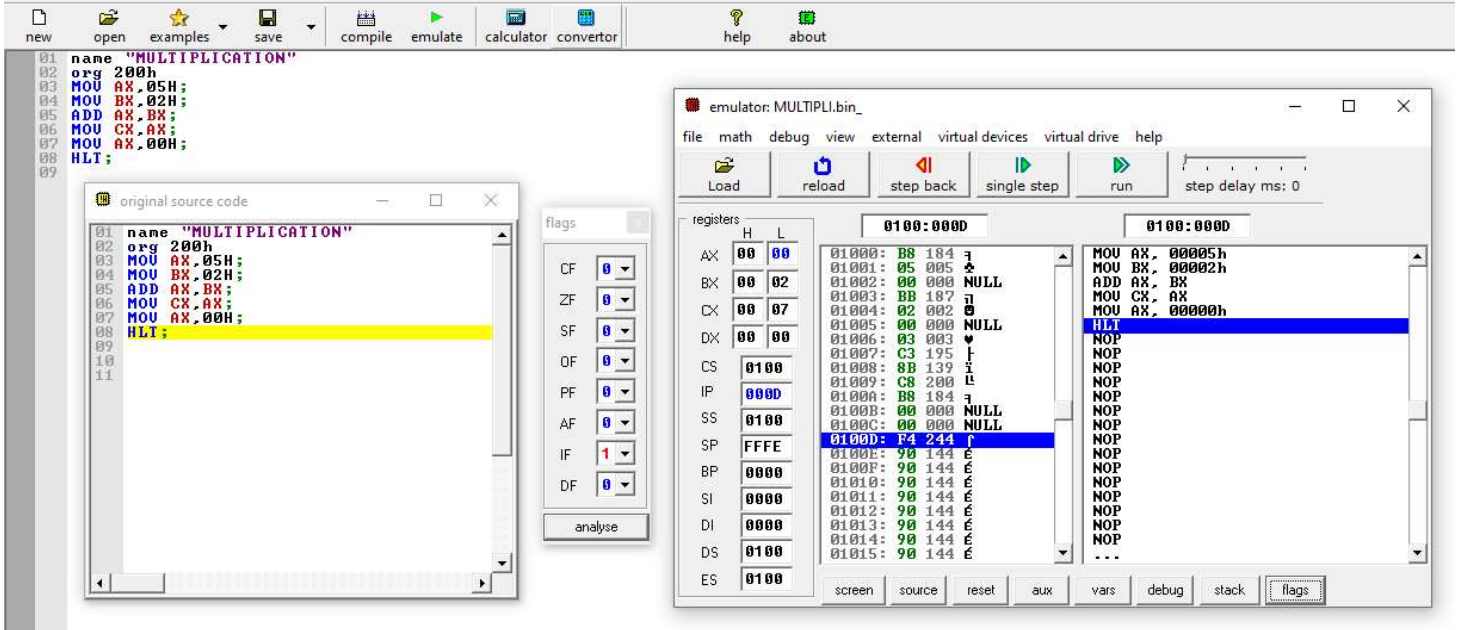
```
MOV AL,00H;
```

```
HLT;
```

' Output

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' Division of 8 bit ALP:

```

name "DIVISION"
org 700h
MOV AL, 40H;
MOV BL, 02H;
DIV BL;
MOV CL, AL;
MOV AL, 00H;
HLT;

```

' Output

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The screenshot displays the emu8086 emulator interface. The main window shows the assembly code editor with the following code:

```

01 name "DIVISION"
02 org 200h
03 mov ax, 05h;
04 mov bx, 02h;
05 add ax, bx;
06 mov cx, ax;
07 mov ax, 00h;
08 hlt;
09

```

The flags window shows the status of various flags:

Flag	Value
CF	0
ZF	0
SF	0
OF	0
PF	0
AF	0
IF	1
DF	0

The main emulator window shows the registers and memory. The registers window displays the following values:

Register	H	L
AX	00	00
BX	00	02
CX	00	07
DX	00	00
CS	0100	
IP	0000	
SS	0100	
SP	FFFE	
BP	0000	
SI	0000	
DI	0000	
DS	0100	
ES	0100	

The memory window shows the following values:

Address	Value	Comment
01000: B8 184	B8 184	
01001: 05 005	05 005	
01002: 00 000	00 000	NULL
01003: B8 187	B8 187	
01004: 02 002	02 002	
01005: 00 000	00 000	NULL
01006: 03 003	03 003	
01007: C3 195	C3 195	
01008: 8B 139	8B 139	
01009: C8 200	C8 200	
0100A: B8 184	B8 184	
0100B: 00 000	00 000	NULL
0100C: 00 000	00 000	NULL
0100D: F4 244	F4 244	
0100E: 90 144	90 144	
0100F: 90 144	90 144	
01010: 90 144	90 144	
01011: 90 144	90 144	
01012: 90 144	90 144	
01013: 90 144	90 144	
01014: 90 144	90 144	
01015: 90 144	90 144	

The code window shows the following assembly code:

```

01 name "DIVISION"
02 org 200h
03 mov ax, 05h;
04 mov bx, 02h;
05 add ax, bx;
06 mov cx, ax;
07 mov ax, 00h;
08 hlt;
09

```

' Result :

Thus, a program is executed on ALP for the fundamental arithmetic and logical operations.