

COAL LAB:

TASK NUMBER :01

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Roll-Number:22P-9009

Step 1: Initialize everything.

Not a single flag

Description: Set the accumulator's (AXE) initial value to 0.

In order to loop over 5 numbers, set the loop counter (CX) to 5.

Put the first integer (num1)'s memory address into the base register (BX).

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

AX 0000 SI 0000 CS 19F5 IP 0103 Stack +0 0000 Flags 7200
 BX 0000 DI 0000 DS 19F5 +2 20CD
 CX 0000 BP 0000 ES 19F5 HS 19F5 +4 9FFF 0F DF IF SF ZF AF PF CF
 DX 0000 SP FFFE SS 19F5 FS 19F5 +6 EA00 0 0 1 0 0 0 0 0

S or SI or SYM
 CMD >S

0100 B80000 MOV AX,0000
 0103 B90000 MOV CX,0000
 0106 BB1D01 MOV BX,011D
 0109 0307 ADD AX,[BX]
 010B 81C30200 ADD BX,0002
 010F 81E90100 SUB CX,0001
 0113 75F4 JNZ 0109
 0115 A32301 MOV [0123],AX
 0118 B8004C MOV AX,4C00

DS:0100 B8 00 00 B9 00 00 BB 1D
 DS:0108 01 03 07 81 C3 02 00 81
 DS:0110 E9 01 00 75 F4 A3 23 01
 DS:0118 B8 00 4C CD 21 05 00 0A
 DS:0120 00 0F 00 96 C6 F6 D1 E0
 DS:0128 D1 E0 C5 5E D8 01 C3 8B
 DS:0130 07 8B 57 02 85 D2 75 04
 DS:0138 85 C0 74 1C C7 46 DC 00
 DS:0140 00 8E 5E FC 83 7D 0E 00
 DS:0148 74 09 8B 46 F2 4B 3B 46

2 0 1 2 3 4 5 6 7 8 9 A B C D E F
 DS:0000 CD 20 FF 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00 = f.8 i.+.t...
 DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00f.
 DS:0020 01 FF FF FF FF FF FF FF FF FF FF FF EB 19 E6 11d.p.
 DS:0030 A2 01 14 00 18 00 F5 19 FF FF FF FF 00 00 00 00 00J.
 DS:0040 05 00 00 00 00 00 00 00 00 00 00 00 00 00 00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 le 10 ri

Step 2: Incorporate Current Value into Accumulator

Registers: AX, BX Flags: Parity Flag (PF) Description: Add the value to the accumulator AX from the memory address that BX pointed to.

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

AX 0005 SI 0000 CS 19F5 IP 010B Stack +0 0000 Flags 7204
 BX 011D DI 0000 DS 19F5 +2 20CD
 CX 0000 BP 0000 ES 19F5 HS 19F5 +4 9FFF 0F DF IF SF ZF AF PF CF
 DX 0000 SP FFFE SS 19F5 FS 19F5 +6 EA00 0 0 1 0 0 0 1 0

S or SI or SYM
 CMD >S

0109 0307 ADD AX,[BX]
 010B 81C30200 ADD BX,0002
 010F 81E90100 SUB CX,0001
 0113 75F4 JNZ 0109
 0115 A32301 MOV [0123],AX
 0118 B8004C MOV AX,4C00
 011B CD21 INT 21
 011D 05000A ADD AX,0000
 0120 000F ADD [BX],CL

DS:0100 B8 00 00 B9 00 00 BB 1D
 DS:0108 01 03 07 81 C3 02 00 81
 DS:0110 E9 01 00 75 F4 A3 23 01
 DS:0118 B8 00 4C CD 21 05 00 0A
 DS:0120 00 0F 00 96 C6 F6 D1 E0
 DS:0128 D1 E0 C5 5E D8 01 C3 8B
 DS:0130 07 8B 57 02 85 D2 75 04
 DS:0138 85 C0 74 1C C7 46 DC 00
 DS:0140 00 8E 5E FC 83 7D 0E 00
 DS:0148 74 09 8B 46 F2 4B 3B 46

2 0 1 2 3 4 5 6 7 8 9 A B C D E F
 DS:0000 CD 20 FF 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00 = f.8 i.+.t...
 DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00f.
 DS:0020 01 FF FF FF FF FF FF FF FF FF FF FF EB 19 E6 11d.p.
 DS:0030 A2 01 14 00 18 00 F5 19 FF FF FF FF 00 00 00 00 00J.
 DS:0040 05 00 00 00 00 00 00 00 00 00 00 00 00 00 00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 le 10 ri

Step 3: The Parity Flag (PF) becomes one.

Step Three: Proceed to the Next Number

Registers: BX

Not a single flag

To point to the next number in memory, increment BX by two bytes
(dw increments by two bytes).

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

Register	Value	Register	Value	Register	Value	Register	Value	Stack	Value	Flags	Value
AX	000F	SI	0000	CS	19F5	IP	010F	Stack	+0 0000	Flags	7214
BX	0121	DI	0000	DS	19F5				+2 20CD		
CX	0007	BP	0000	ES	19F5	HS	19F5		+4 9FFF	OF	DF
DX	0000	SP	FFFE	SS	19F5	FS	19F5		+6 EA00	IF	SF
										ZF	AF
										PF	CF

CMD >S

010B 81C30200 ADD BX,0002
010F 81E90100 SUB CX,0001
0113 75F4 JNZ 0109
0115 A32301 MOV [0123],AX
0118 B8004C MOV AX,4C00
011B CD21 INT 21
011D 05000A ADD AX,0A00
0120 000F ADD [BX],CL
0122 0096C6F6 ADD [F6C6+BP],DL

DS:0100 B8 00 00 B9 00 00 BB 1D
DS:0108 01 03 07 81 C3 02 00 81
DS:0110 E9 01 00 75 F4 A3 23 01
DS:0118 B8 00 4C CD 21 05 00 0A
DS:0120 00 0F 00 96 C6 F6 D1 E0
DS:0128 D1 E0 C5 5E D8 01 C3 8B
DS:0130 07 8B 57 02 85 D2 75 04
DS:0138 85 C0 74 1C C7 46 DC 00
DS:0140 00 8E 5E FC 83 7D 0E 00
DS:0148 74 09 8B 46 F2 48 3B 46

2 0 1 2 3 4 5 6 7 8 9 A B C D E F
DS:0000 CD 20 FF 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00 = f.n i...+...
DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00a.
DS:0020 01 FF FF FF FF FF FF FF FF FF FF FF EB 19 E6 11d.p.
DS:0030 A2 01 14 00 18 00 F5 19 FF FF FF FF 00 00 00 00 6.....J.
DS:0040 05 00 00 00 00 00 00 00 00 00 00 00 00 00 00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 lc 10 ri

Step 4: Decreasing the Loop Counter

Registers: CX No Flags

Description: To keep track of iterations, decrease the loop counter CX by 1.

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

Register	Value	Register	Value	Register	Value	Register	Value	Stack	Value	Flags	Value
AX	C6B4	SI	0000	CS	19F5	IP	010B	Stack	+0 0000	Flags	7294
BX	0123	DI	0000	DS	19F5				+2 20CD		
CX	0005	BP	0000	ES	19F5	HS	19F5		+4 9FFF	OF	DF
DX	0000	SP	FFFE	SS	19F5	FS	19F5		+6 EA00	IF	SF
										ZF	AF
										PF	CF

CMD >S

0109 0307 ADD AX,[BX]
010B 81C30200 ADD BX,0002
010F 81E90100 SUB CX,0001
0113 75F4 JNZ 0109
0115 A32301 MOV [0123],AX
0118 B8004C MOV AX,4C00
011B CD21 INT 21
011D 05000A ADD AX,0A00
0120 000F ADD [BX],CL

DS:0100 B8 00 00 B9 00 00 BB 1D
DS:0108 01 03 07 81 C3 02 00 81
DS:0110 E9 01 00 75 F4 A3 23 01
DS:0118 B8 00 4C CD 21 05 00 0A
DS:0120 00 0F 00 96 C6 F6 D1 E0
DS:0128 D1 E0 C5 5E D8 01 C3 8B
DS:0130 07 8B 57 02 85 D2 75 04
DS:0138 85 C0 74 1C C7 46 DC 00
DS:0140 00 8E 5E FC 83 7D 0E 00
DS:0148 74 09 8B 46 F2 48 3B 46

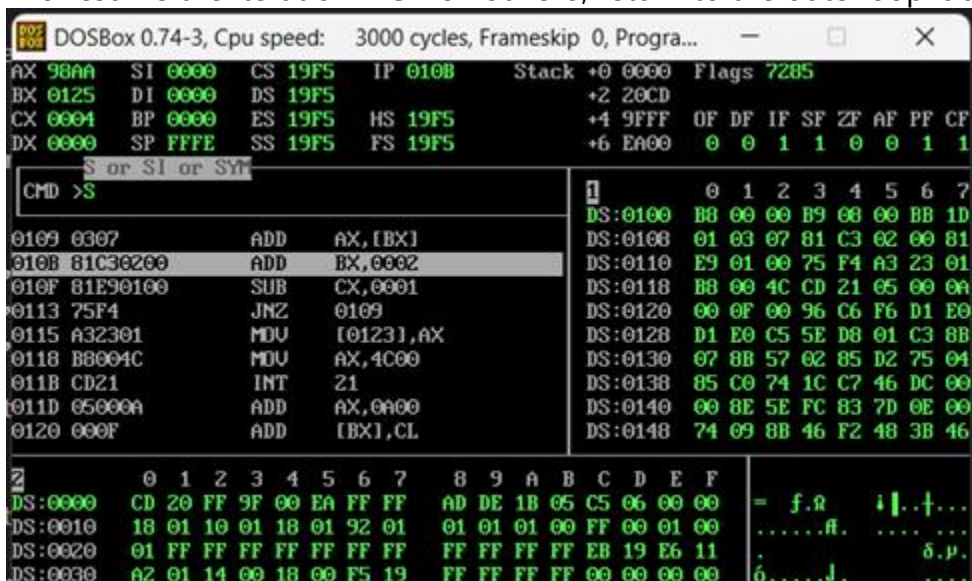
2 0 1 2 3 4 5 6 7 8 9 A B C D E F
DS:0000 CD 20 FF 9F 00 EA FF FF AD DE 1B 05 C5 06 00 00 = f.n i...+...
DS:0010 18 01 10 01 18 01 92 01 01 01 01 00 FF 00 01 00a.
DS:0020 01 FF FF FF FF FF FF FF FF FF FF FF EB 19 E6 11d.p.
DS:0030 A2 01 14 00 18 00 F5 19 FF FF FF FF 00 00 00 00 6.....J.
DS:0040 05 00 00 00 00 00 00 00 00 00 00 00 00 00 00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 lc 10 ri

Step 5: Examine the condition of the loop

Registers: CX

To resume the iteration if CX is not zero, return to the outerloop label.

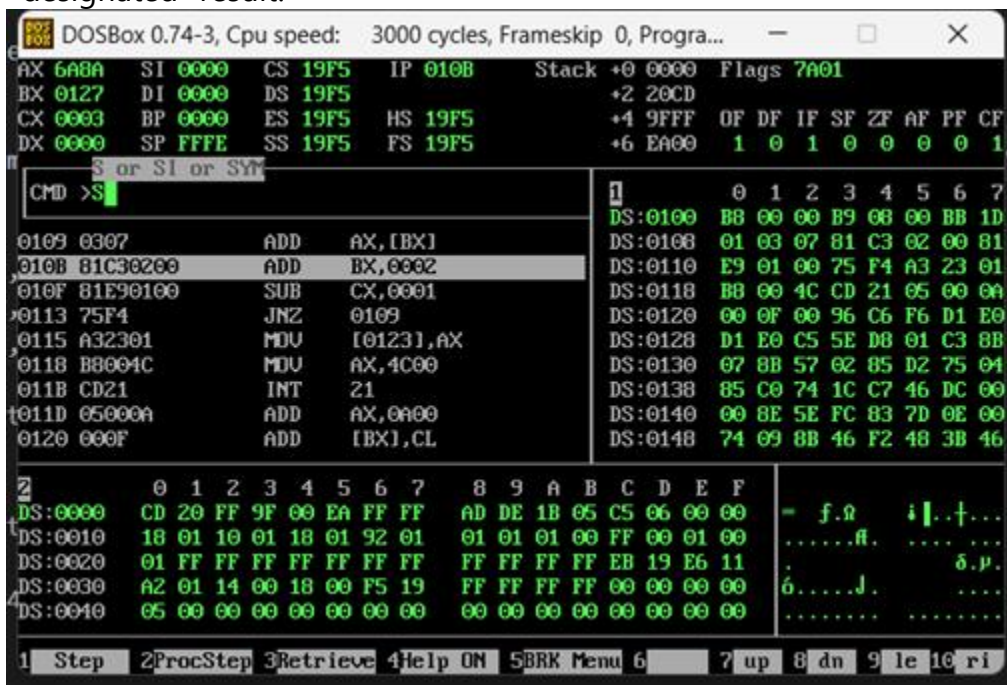


Step 6: Save the Outcome

Registers: AXE

Not a single flag

The final amount, which is kept in AXE, should be stored in the memory address designated "result."



Step 7: Get Ready to End the Programme

Registers: AXE

Not a single flag

Description: Assemble the required registers in order to become ready for programme termination.

Run a DOS system call to put an end to the software.

The screenshot shows the DOSBox 0.74-3 interface. At the top, it displays 'DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...'. Below this, a table of CPU registers is shown: AX: 306A, SI: 0000, CS: 19F5, IP: 010B, Stack: +0 0000, Flags: 7205; BX: 0129, DI: 0000, DS: 19F5, +2 20CD; CX: 0002, BP: 0000, ES: 19F5, HS: 19F5, +4 9FFF, OF: DF, IF: SF, ZF: AF, PF: CF; DX: 0000, SP: FFFE, SS: 19F5, FS: 19F5, +6 Ea00, 0 0 1 0 0 0 1 1. Below the registers, a command prompt shows 'CMD >S'. The assembly code window displays a list of instructions: 0109 0307 ADD AX, [BX]; 010B 81C30209 ADD BX, 0002; 010F 81E90100 SUB CX, 0001; 0113 75F4 JNZ 0109; 0115 A32301 MOV [0123], AX; 0118 B8004C MOV AX, 4C00; 011B CD21 INT 21; 011D 65000A ADD AX, 0A00; 0120 000F ADD [BX], CL. The memory dump window shows a hex dump of memory starting from DS:0100, with values like BB 00 00 B9 00 00 BB 1D, etc. The bottom status bar shows '1 Step 2ProcStep 3Retrieve 4Help ON 5ERR Menu 6 7 up 8 dn 9 le 10 ri'.

Step 8:

This step involves no notable alterations or occurrences.

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

AX	00C8	SI	0000	CS	19F5	IP	010B	Stack	+0 0000	Flags	7211
BX	012B	DI	0000	DS	19F5				+2 20CD		
CX	0001	BP	0000	ES	19F5	HS	19F5		+4 9FFF	OF	DF
DX	0000	SP	FFFE	SS	19F5	FS	19F5		+6 EA00	IF	SF
										ZF	AF
										PF	CF
										0	1
										0	1
										0	1

CMD >S

0109	0307	ADD	AX,[BX]	DS:0100	B8 00 00 B9 00 00 BB 1D
010B	B1C30200	ADD	BX,0002	DS:0108	01 03 07 81 C3 02 00 81
010F	81E90100	SUB	CX,0001	DS:0110	E9 01 00 75 F4 A3 23 01
0113	75F4	JNZ	0109	DS:0118	B8 00 4C CD 21 05 00 0A
0115	A32301	MOV	[0123],AX	DS:0120	00 0F 00 96 C6 F6 D1 E0
0118	B8004C	MOV	AX,4C00	DS:0128	D1 E0 C5 5E D8 01 C3 8B
011B	CD21	INT	21	DS:0130	07 8B 57 02 85 D2 75 04
011D	05000A	ADD	AX,0A00	DS:0138	85 C0 74 1C C7 46 DC 00
0120	000F	ADD	[BX],CL	DS:0140	00 8E 5E FC 83 7D 0E 00
				DS:0148	74 09 8B 46 F2 48 3B 46

2	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
DS:0000	CD	20	FF	9F	00	EA	FF	FF	AD	DE	1B	05	C5	06	00	00
DS:0010	18	01	10	01	18	01	92	01	01	01	00	FF	00	01	00	00
DS:0020	01	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EB	19	E6	11
DS:0030	A2	01	14	00	18	00	F5	19	FF	FF	FF	FF	00	00	00	00
DS:0040	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 lc 10 ri

Step 9: Setting the Zero Flag (ZF)

Registers: Not present Flags: Not present (ZF)

Description:Zero Flag (ZF) is set to 1

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

AX	00C8	SI	0000	CS	19F5	IP	0113	Stack	+0 0000	Flags	7244
BX	012D	DI	0000	DS	19F5				+2 20CD		
CX	0000	BP	0000	ES	19F5	HS	19F5		+4 9FFF	OF	DF
DX	0000	SP	FFFE	SS	19F5	FS	19F5		+6 EA00	IF	SF
										ZF	AF
										PF	CF
										0	1
										0	1
										0	1

CMD >S

010F	81E90100	SUB	CX,0001	DS:0100	B8 00 00 B9 00 00 BB 1D
0113	75F4	JNZ	0109	DS:0108	01 03 07 81 C3 02 00 81
0115	A32301	MOV	[0123],AX	DS:0110	E9 01 00 75 F4 A3 23 01
0118	B8004C	MOV	AX,4C00	DS:0118	B8 00 4C CD 21 05 00 0A
011B	CD21	INT	21	DS:0120	00 0F 00 96 C6 F6 D1 E0
011D	05000A	ADD	AX,0A00	DS:0128	D1 E0 C5 5E D8 01 C3 8B
0120	000F	ADD	[BX],CL	DS:0130	07 8B 57 02 85 D2 75 04
0122	0096C6F6	ADD	[F6C6+BP],DL	DS:0138	85 C0 74 1C C7 46 DC 00
0126	D1E0	SHL	AX,1	DS:0140	00 8E 5E FC 83 7D 0E 00
				DS:0148	74 09 8B 46 F2 48 3B 46

2	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
DS:0000	CD	20	FF	9F	00	EA	FF	FF	AD	DE	1B	05	C5	06	00	00
DS:0010	18	01	10	01	18	01	92	01	01	01	00	FF	00	01	00	00
DS:0020	01	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EB	19	E6	11
DS:0030	A2	01	14	00	18	00	F5	19	FF	FF	FF	FF	00	00	00	00
DS:0040	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 lc 10 ri

Step 10: Terminate Programme

Description: The programme comes to an end.

DOSBox 0.74-3, Cpu speed: 3000 cycles, Frameskip 0, Progra...

AX 4C00 SI 0000 CS F000 IP 14A0 Stack +0 42BD Flags 7044
BX 012D DI 0000 DS 19F5 +2 06C5
CX 0000 BP 0000 ES 19F5 HS 19F5 +4 7044 OF DF IF SF ZF AF PF CF
DX 0000 SP FFF2 SS 19F5 FS 19F5 +6 011D 0 0 0 0 1 0 1 0

\$ or SI or SYM
CMD >S

011B CD21	INT	21
14A0 FB	STI	
14A1 FE	DB	FE
14A2 3825	CMP	DI, AH
14A4 00CF	ADD	BH, CL
14A6 CB	RET	Far
14A7 51	PUSH	CX
14A8 B94001	MOV	CX, 0140
14AB E2FE	LOOP	14AB

	0	1	2	3	4	5	6	7
DS:0100	B8	00	00	B9	08	00	BB	1D
DS:0108	01	03	07	81	C3	02	00	81
DS:0110	E9	01	00	75	F4	A3	23	01
DS:0118	B8	00	4C	CD	21	05	00	0A
DS:0120	00	0F	00	C8	08	F6	D1	E0
DS:0128	D1	E0	C5	5E	D8	01	C3	8B
DS:0130	07	8B	57	02	85	D2	75	04
DS:0138	85	C0	74	1C	C7	46	DC	00
DS:0140	00	8E	5E	FC	83	7D	0E	00
DS:0148	74	09	8B	46	F2	48	3B	46

	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F
DS:0000	CD	20	FF	9F	00	EA	FF	FF	AD	DE	1B	05	C5	06	00	00
DS:0010	18	01	10	01	18	01	92	01	01	01	00	FF	00	01	00	
DS:0020	01	FF	FF	FF	FF	FF	FF	FF	FF	FF	FF	EB	19	E6	11	
DS:0030	A2	01	14	00	18	00	F5	19	FF	FF	FF	FF	00	00	00	00
DS:0040	05	00	00	00	00	00	00	00	00	00	00	00	00	00	00	00

1 Step 2ProcStep 3Retrieve 4Help ON 5BRK Menu 6 7 up 8 dn 9 le 10 ri