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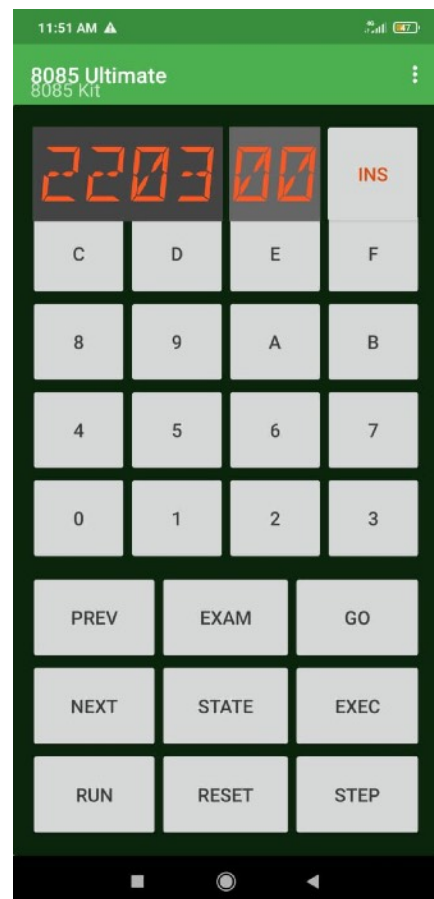
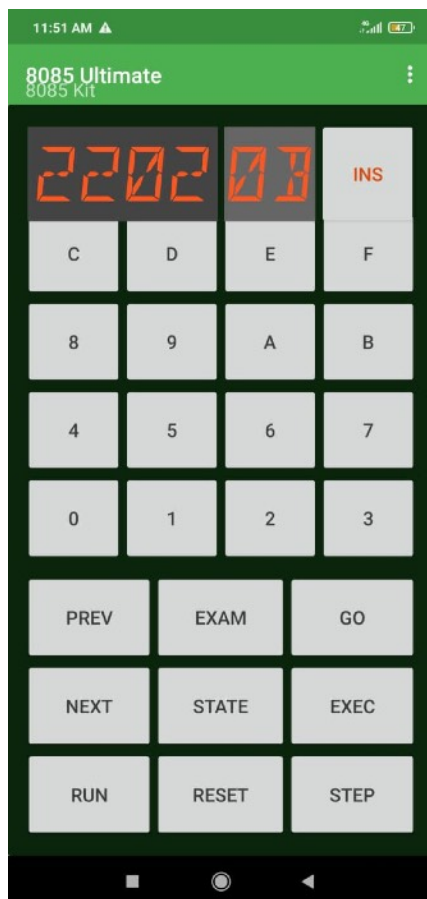
## 8085 MPU Problem Sheet #1

1. Load the contents of the memory locations 2200<sub>H</sub> and 2201<sub>H</sub> into registers. Add these registers and store the result in memory locations 2202<sub>H</sub> and 2203<sub>H</sub>.

1	0000		LDA 2200	3A	First value copied into accumulator From memory location 2200H
	0001			00	
	0002			22	
2	0003		MOV B,A	47	First value moved from accumulator to register B
3	0004		LDA 2201	3A	Second value copied into accumulator from memory location 2201H
	0005			01	
	0006			22	
4	0007		ADD B	80	Add value of register B(first value) with accumulator(second value) And store sum in accumulator
5	0008		STA 2202	32	Copy value of accumulator(sum) into memory location 2202H
	0009			02	
	000A			22	
6	000B		MVI A,00	3E	Make accumulator value 00H
	000C			00	
7	000D		ADC A	8F	Add carry bit to accumulator(00H) And store sum in accumulator to get the final carry of the our required sum into accumulator(if any)
8	000E		STA 2203	32	Copy value of accumulator(sum) into memory location 2203H
	000F			03	
	0010			22	
9	0011		HLT	76	STOP



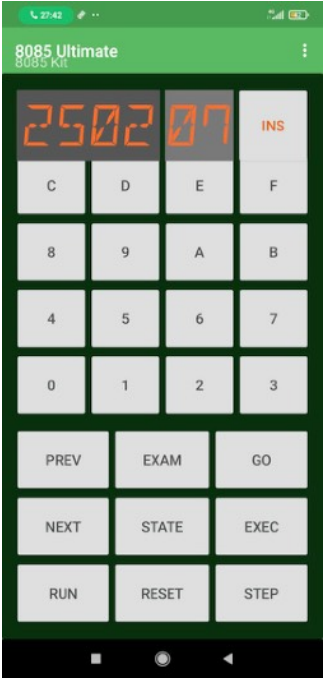
**Output:**



2. Find the sum of N numbers stored in consecutive locations starting from 2500<sub>H</sub>. The value of N is stored in 2200<sub>H</sub>. Store the result in locations 2300<sub>H</sub> and 2301<sub>H</sub>.

1	0000		LDA 2200	3A	Value of N stored in accumulator from memory location 2200H
	0001			00	
	0002			22	
2	0003		MOV B,A	47	Copy value of accumulator to register B
3	0004		LXI H,2500	21	HL = 2500H
	0005			00	
	0006			25	
4	0007		LXI D,0000	11	DE = 0000H
	0008			00	
	0009			00	
5	000A	LOOP	MOV A,M	7E	Copy content of memory location stored in HL into accumulator
6	000B		ADD E	83	Add content of E to content of accumulator and store in A
7	000C		MOV E,A	5F	Copy content of accumulator to register E
8	000D		MVI A,00	3E	Accumulator = 00H
	000E			00	
9	000F		ADC A	8F	Add carry bit to accumulator(00H) And store sum in accumulator to get the final carry of the previous sum into accumulator(if any)
10	0010		ADD D	82	Add content of D to content of accumulator and store in A
11	0011		MOV D,A	57	Copy content of accumulator to register D
12	0012		INX H	23	Increment the value of HL
13	0013		DCR B	05	Decrement B
14	0014		JNZ LOOP	C2	Go to LOOP label if zero flag not set
	0015			0A	
	0016			00	
15	0017		XCHG	EB	Exchange contents of DE and HL
16	0018		SHLD 2300	22	Store value of HL in memory location 2300H

	0019			00	
	001A			23	
17	001B		HLT	76	STOP



Output:



3. Find the sum of the least significant 4 bits and most significant 4 bits of a byte stored in memory location 2500<sub>H</sub>. Store the result in 2550<sub>H</sub>.

1	0000		LDA 2500	3A	A = M[2500H]
	0001			00	
	0002			25	
2	0003		MVI B,04	06	Register B = 04H
	0004			04	
3	0005		MVI D,00	16	Register D = 00H, stores higher 4 bits
	0006			00	
4	0007	LOOP1	RLC	07	Rotate bits of accumulator left
5	0008		MOV C,A	4F	Register C = [A]
6	0009		MVI A,00	3E	A = 00H
	000A			00	
7	000B		ADC A	8F	A stores the carry bit i.e. the current MSB
8	000C		ADD D	82	A = [D] + [A]
9	000D		DCR B	05	Register B content decrement
10	000E		JZ SKIP1	CA	Go to SKIP1 label if zero flag set i.e. B was 1 Because we don't want to rotate D anymore after all 4 bits have been added
	000F			12	
	0010			00	
11	0011		RLC	07	Rotate bits of accumulator left before storing in D
12	0012	SKIP1	INR B	04	Increment B content, due to earlier decrement
13	0013		MOV D,A	57	Register D = [A]
14	0014		MOV A,C	79	A = [C]
15	0015		DCR B	05	Register B content decrement
16	0016		JNZ LOOP1	C2	Go to LOOP1 label if zero flag not set
	0017			07	
	0018			00	
17	0019		MVI E,00	1E	Register E = 00H, stores the lower 4 bits
	001A			00	
18	001B		MVI B,04	06	Register. B = 04H
	001C			04	
19	001D	LOOP2	RLC	07	Rotate bits of accumulator left
20	001E		MOV C,A	4F	C = [A]

21	001F		MVI A,00	3E	A = 00H
	0020			00	
22	0021		ADC A	8F	A = [Carry flag]
23	0022		ADD E	83	A = [A]+[E]
24	0023		DCR B	05	Register B content decrement
25	0024		JZ SKIP2	CA	Go to SKIP2 label if zero flag set
	0025			28	
	0026			00	
26	0027		RLC	07	Rotate bits of accumulator left
27	0028	SKIP2	INR B	04	Increment register B content
28	0029		MOV E,A	5F	E = [A]
29	002A		MOV A,C	79	A = [C]
30	002B		DCR B	05	Register B content decrement
31	002C		JNZ LOOP2	C2	Go to LOOP2 label if zero flag not set
	002D			1D	
	002E			00	
32	002F		MOV A,E	7B	A = [E]
33	0030		ADD D	82	A = [A]+[D], required sum
34	0031		STA 2550	32	M[2550H] = [A]
	0032			50	
	0033			25	
35	0034		HLT	76	STOP

Output:

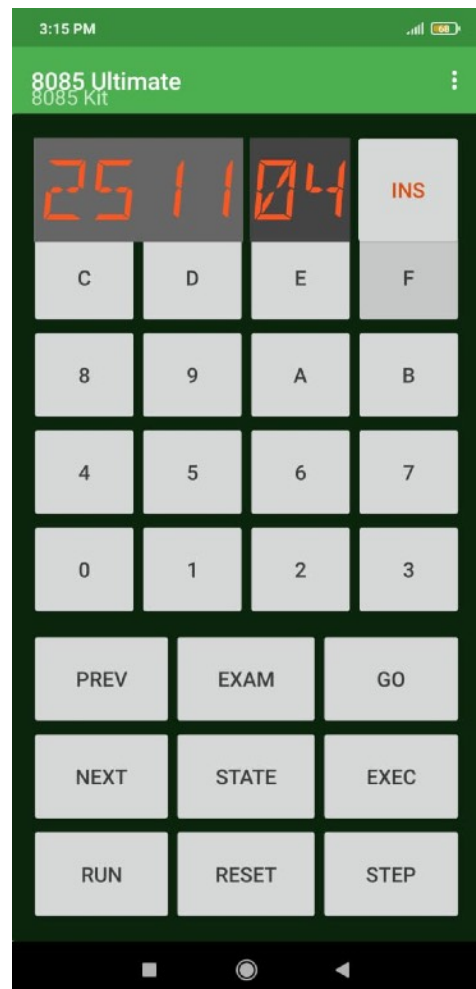


4. Write a program to count the '1's and '0's of a byte stored in 2500<sub>H</sub>. Store the result in 2610<sub>H</sub> and 2511<sub>H</sub>, respectively.

1	0000		LDA 2500	3A	A = M[2500H]
	0001			00	
	0002			25	
2	0003		MVI B,08	06	B = 08H
	0004			08	
3	0005		LXI D,0000	11	DE = 0000H
	0006			00	
	0007			00	
4	0008	LOOP	RLC	07	Rotate content of accumulator left
5	0009		JNC FILLE	D2	If carry bit not set, Go To FILLE label To increment E which indicates the number of 1s
	000A			10	
	000B			00	
6	000C		INR D	14	Increment content of register D, which indicates the number of 0s
7	000D		JMP SKIP	C3	Go To SKIP label, to skip incrementing E
	000E			11	
	000F			00	
8	0010	FILLE	INR E	1C	Increment content of register E
9	0011	SKIP	DCR B	05	Decrement content of register B
10	0012		JNZ LOOP	C2	If zero bit not set, Go To LOOP label
	0013			08	
	0014			00	
11	0015		MOV A,D	7A	A = [D]
12	0016		STA 2610	32	M[2610H] = [A]
	0017			10	
	0018			26	
13	0019		MOV A,E	7B	A = [E]
14	001A		STA 2511	32	M[2511H] = [A]
	001B			11	
	001C			25	
15	001D		HLT	76	STOP



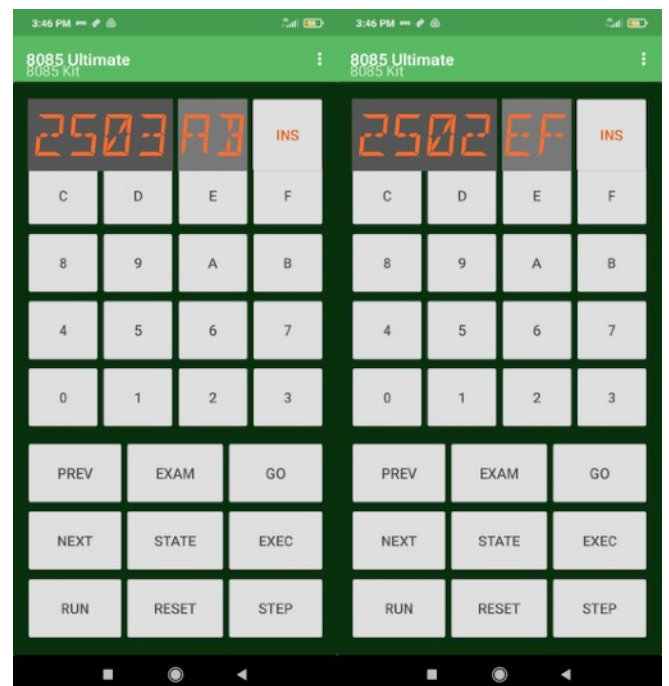
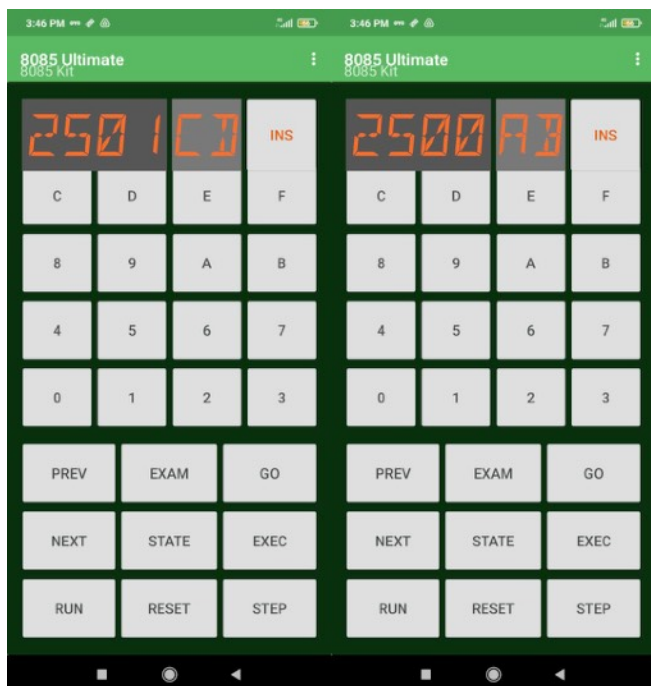
**Output:**





5. Write a program to sum two 16-bits binary numbers.

1	0000		LHLD 2500	2A	Store 16 bit number from 2501H and 2500H
	0001			00	
	0002			25	
2	0003		XCHG	EB	Exchange the contents of DE and HL
3	0004		LHLD 2502	2A	Store 16 bit number from 2503H and 2502H
	0005			02	
	0006			25	
4	0007		DAD D	19	Add contents of HL and DE and store in HL
5	0008		MVI A,00	3E	A = 00H
	0009			00	
6	000A		ADC A	8F	Final carry value in A
7	000B		SHLD 2000	22	Store the sum in 2001H and 2000H
	000C			00	
	000D			20	
8	000E		STA 2002	32	Store final carry in 2002H
	000F			02	
	0010			20	
9	0011		HLT	76	STOP



Output:

