

Evaluation of function

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EVALUATION OF FUNCTION $1+X+X^2$

AIM

To write an assembly language program to compute the series $1+x+x^2$

ASSEMBLY LANGUAGE PROGRAM

```

3400 LDA  3100    3A ; Load the accumulator with value of x
3401                      00 ;
3402                      31 ;
3403 MVI  D 00    16 ; Move immediate 00H to D register
3404                      00 ;
3405 MOV  B A     47 ; Move the accumulator content to B register
3406 MOV  C A     4F ; Move the accumulator content to C register
3407 ADD  C       81 ; Add the C register content with accumulator
3408 JNC  340C    D2 ; Jump if no carry to 340CH
3409                      0C ;
340A                      34 ;
340B INR  D      14 ; Increment the D register
340C DCR  B      05 ; Decrement the B register
340D JNZ  3407    C2 ; Jump if no zero to 3407H
340E                      07 ;
340F                      34 ;
3410 INR  A      3C ; Increment the A register content
3411 STA  3103    32 ; Store the accumulator content(sum) at 3103H
3412                      03 ;
3413                      31 ;
3414 MOV  A D     7A ; Move the D register content to accumulator
3415 STA  3104    32 ; Store the accumulator content(carry) at 3104H
3416                      04 ;
3417                      31 ;
3418 HLT                    76 ; Halt the execution

```

EXECUTION - 1

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3100 02 ; Value of X(Input data)
3103 07 ; Sum(Output data)
3104 00 ; Carry(Output data)

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PROGRAM TRACE

Addr	MC	Mnemonic	A	B	C	D	E	H	L	SP	Flag Word
			00	00	00	00	00	00	00	0000	0000 0000
3400	3A	LDA 3100	02	00	00	00	00	00	00	0000	0000 0000
3403	16	MVI D 00	02	00	00	00	00	00	00	0000	0000 0000
3405	47	MOV B A	02	02	00	00	00	00	00	0000	0000 0000
3406	4F	MOV C A	02	02	02	00	00	00	00	0000	0000 0000
3407	81	ADD C	04	02	02	00	00	00	00	0000	0000 0000
3408	D2	JNC 340C	04	02	02	00	00	00	00	0000	0000 0000
340C	05	DCR B	04	01	02	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	04	01	02	00	00	00	00	0000	0001 0000
3407	81	ADD C	06	01	02	00	00	00	00	0000	0000 0100
3408	D2	JNC 340C	06	01	02	00	00	00	00	0000	0000 0100
340C	05	DCR B	06	00	02	00	00	00	00	0000	0101 0100
340D	C2	JNZ 3407	06	00	02	00	00	00	00	0000	0101 0100
3410	3C	INR A	07	00	02	00	00	00	00	0000	0000 0000
3411	32	STA 3103	07	00	02	00	00	00	00	0000	0000 0000
3414	7A	MOV A D	00	00	02	00	00	00	00	0000	0000 0000
3415	32	STA 3104	00	00	02	00	00	00	00	0000	0000 0000
3418	76	HLT	00	00	02	00	00	00	00	0000	0000 0000

FLAG WORD

S	Z	x	Ac	x	P	x	Cy
0	0	0	0	0	0	0	0

EXECUTION - 2

3100 10 ; Value of X(Input data)
 3103 11 ; Sum(Output data)
 3104 01 ; Carry(Output data)

PROGRAM TRACE

Addr	MC	Mnemonic	A	B	C	D	E	H	L	SP	Flag Word
			00	00	00	00	00	00	00	0000	0000 0000
3400	3A	LDA 3100	10	00	00	00	00	00	00	0000	0000 0000
3403	16	MVI D 00	10	00	00	00	00	00	00	0000	0000 0000
3405	47	MOV B A	10	10	00	00	00	00	00	0000	0000 0000
3406	4F	MOV C A	10	10	10	00	00	00	00	0000	0000 0000
3407	81	ADD C	20	10	10	00	00	00	00	0000	0000 0000
3408	D2	JNC 340C	20	10	10	00	00	00	00	0000	0000 0000
340C	05	DCR B	20	0F	10	00	00	00	00	0000	0000 0100
340D	C2	JNZ 3407	20	0F	10	00	00	00	00	0000	0000 0100
3407	81	ADD C	30	0F	10	00	00	00	00	0000	0000 0100
3408	D2	JNC 340C	30	0F	10	00	00	00	00	0000	0000 0100
340C	05	DCR B	30	0E	10	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	30	0E	10	00	00	00	00	0000	0001 0000
3407	81	ADD C	40	0E	10	00	00	00	00	0000	0000 0000
3408	D2	JNC 340C	40	0E	10	00	00	00	00	0000	0000 0000
340C	05	DCR B	40	0D	10	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	40	0D	10	00	00	00	00	0000	0001 0000
3407	81	ADD C	50	0D	10	00	00	00	00	0000	0000 0100
3408	D2	JNC 340C	50	0D	10	00	00	00	00	0000	0000 0100
340C	05	DCR B	50	0C	10	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	50	0C	10	00	00	00	00	0000	0001 0100
3407	81	ADD C	60	0C	10	00	00	00	00	0000	0000 0100
3408	D2	JNC 340C	60	0C	10	00	00	00	00	0000	0000 0100
340C	05	DCR B	60	0B	10	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	60	0B	10	00	00	00	00	0000	0001 0000
3407	81	ADD C	70	0B	10	00	00	00	00	0000	0000 0000
3408	D2	JNC 340C	70	0B	10	00	00	00	00	0000	0000 0000
340C	05	DCR B	70	0A	10	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	70	0A	10	00	00	00	00	0000	0001 0100
3407	81	ADD C	80	0A	10	00	00	00	00	0000	1000 0000
3408	D2	JNC 340C	80	0A	10	00	00	00	00	0000	1000 0000
340C	05	DCR B	80	09	10	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	80	09	10	00	00	00	00	0000	0001 0100
3407	81	ADD C	90	09	10	00	00	00	00	0000	1000 0100
3408	D2	JNC 340C	90	09	10	00	00	00	00	0000	1000 0100
340C	05	DCR B	90	08	10	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	90	08	10	00	00	00	00	0000	0001 0000
3407	81	ADD C	A0	08	10	00	00	00	00	0000	1000 0100
3408	D2	JNC 340C	A0	08	10	00	00	00	00	0000	1000 0100
340C	05	DCR B	A0	07	10	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	A0	07	10	00	00	00	00	0000	0001 0000
3407	81	ADD C	B0	07	10	00	00	00	00	0000	1000 0000
3408	D2	JNC 340C	B0	07	10	00	00	00	00	0000	1000 0000
340C	05	DCR B	B0	06	10	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	B0	06	10	00	00	00	00	0000	0001 0100
3407	81	ADD C	C0	06	10	00	00	00	00	0000	1000 0100
3408	D2	JNC 340C	C0	06	10	00	00	00	00	0000	1000 0100

340C	05	DCR B	C0	05	10	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	C0	05	10	00	00	00	00	0000	0001 0100
3407	81	ADD C	D0	05	10	00	00	00	00	0000	1000 0000
3408	D2	JNC 340C	D0	05	10	00	00	00	00	0000	1000 0000
340C	05	DCR B	D0	04	10	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	D0	04	10	00	00	00	00	0000	0001 0000
3407	81	ADD C	E0	04	10	00	00	00	00	0000	1000 0000
3408	D2	JNC 340C	E0	04	10	00	00	00	00	0000	1000 0000
340C	05	DCR B	E0	03	10	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	E0	03	10	00	00	00	00	0000	0001 0100
3407	81	ADD C	F0	03	10	00	00	00	00	0000	1000 0100
3408	D2	JNC 340C	F0	03	10	00	00	00	00	0000	1000 0100
340C	05	DCR B	F0	02	10	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	F0	02	10	00	00	00	00	0000	0001 0000
3407	81	ADD C	00	02	10	00	00	00	00	0000	0100 0101
3408	D2	JNC 340C	00	02	10	00	00	00	00	0000	0100 0101
340B	14	INR D	00	02	10	01	00	00	00	0000	0000 0001
340C	05	DCR B	00	01	10	01	00	00	00	0000	0001 0001
340D	C2	JNZ 3407	00	01	10	01	00	00	00	0000	0001 0001
3407	81	ADD C	10	01	10	01	00	00	00	0000	0000 0000
3408	D2	JNC 340C	10	01	10	01	00	00	00	0000	0000 0000
340C	05	DCR B	10	00	10	01	00	00	00	0000	0101 0100
340D	C2	JNZ 3407	10	00	10	01	00	00	00	0000	0101 0100
3410	3C	INR A	11	00	10	01	00	00	00	0000	0000 0100
3411	32	STA 3103	11	00	10	01	00	00	00	0000	0000 0100
3414	7A	MOV A D	01	00	10	01	00	00	00	0000	0000 0100
3415	32	STA 3104	01	00	10	01	00	00	00	0000	0000 0100
3418	76	HLT	01	00	10	01	00	00	00	0000	0000 0100

FLAG WORD

S	Z	x	Ac	x	P	x	Cy
0	0	0	0	0	1	0	0

EXECUTION - 3

3100 0A ; Value of X(Input data)
 3103 6F ; Sum(Output data)
 3104 00 ; Carry(Output data)

PROGRAM TRACE

Addr	MC	Mnemonic	A	B	C	D	E	H	L	SP	Flag Word
			00	00	00	00	00	00	00	0000	0000 0000
3400	3A	LDA 3100	0A	00	00	00	00	00	00	0000	0000 0000
3403	16	MVI D 00	0A	00	00	00	00	00	00	0000	0000 0000
3405	47	MOV B A	0A	0A	00	00	00	00	00	0000	0000 0000
3406	4F	MOV C A	0A	0A	0A	00	00	00	00	0000	0000 0000
3407	81	ADD C	14	0A	0A	00	00	00	00	0000	0001 0100
3408	D2	JNC 340C	14	0A	0A	00	00	00	00	0000	0001 0100
340C	05	DCR B	14	09	0A	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	14	09	0A	00	00	00	00	0000	0001 0100
3407	81	ADD C	1E	09	0A	00	00	00	00	0000	0000 0100
3408	D2	JNC 340C	1E	09	0A	00	00	00	00	0000	0000 0100
340C	05	DCR B	1E	08	0A	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	1E	08	0A	00	00	00	00	0000	0001 0000
3407	81	ADD C	28	08	0A	00	00	00	00	0000	0001 0100
3408	D2	JNC 340C	28	08	0A	00	00	00	00	0000	0001 0100
340C	05	DCR B	28	07	0A	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	28	07	0A	00	00	00	00	0000	0001 0000
3407	81	ADD C	32	07	0A	00	00	00	00	0000	0001 0000
3408	D2	JNC 340C	32	07	0A	00	00	00	00	0000	0001 0000
340C	05	DCR B	32	06	0A	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	32	06	0A	00	00	00	00	0000	0001 0100
3407	81	ADD C	3C	06	0A	00	00	00	00	0000	0000 0100
3408	D2	JNC 340C	3C	06	0A	00	00	00	00	0000	0000 0100
340C	05	DCR B	3C	05	0A	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	3C	05	0A	00	00	00	00	0000	0001 0100
3407	81	ADD C	46	05	0A	00	00	00	00	0000	0001 0000
3408	D2	JNC 340C	46	05	0A	00	00	00	00	0000	0001 0000
340C	05	DCR B	46	04	0A	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	46	04	0A	00	00	00	00	0000	0001 0000
3407	81	ADD C	50	04	0A	00	00	00	00	0000	0001 0100
3408	D2	JNC 340C	50	04	0A	00	00	00	00	0000	0001 0100
340C	05	DCR B	50	03	0A	00	00	00	00	0000	0001 0100
340D	C2	JNZ 3407	50	03	0A	00	00	00	00	0000	0001 0100
3407	81	ADD C	5A	03	0A	00	00	00	00	0000	0000 0100
3408	D2	JNC 340C	5A	03	0A	00	00	00	00	0000	0000 0100
340C	05	DCR B	5A	02	0A	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	5A	02	0A	00	00	00	00	0000	0001 0000
3407	81	ADD C	64	02	0A	00	00	00	00	0000	0001 0000
3408	D2	JNC 340C	64	02	0A	00	00	00	00	0000	0001 0000
340C	05	DCR B	64	01	0A	00	00	00	00	0000	0001 0000
340D	C2	JNZ 3407	64	01	0A	00	00	00	00	0000	0001 0000
3407	81	ADD C	6E	01	0A	00	00	00	00	0000	0000 0000
3408	D2	JNC 340C	6E	01	0A	00	00	00	00	0000	0000 0000
340C	05	DCR B	6E	00	0A	00	00	00	00	0000	0101 0100
340D	C2	JNZ 3407	6E	00	0A	00	00	00	00	0000	0101 0100
3410	3C	INR A	6F	00	0A	00	00	00	00	0000	0000 0100
3411	32	STA 3103	6F	00	0A	00	00	00	00	0000	0000 0100

3414	7A	MOVAD	00	00	0A	00	00	00	00	0000	0000 0100
3415	32	STA 3104	00	00	0A	00	00	00	00	0000	0000 0100
3418	76	HLT	00	00	0A	00	00	00	00	0000	0000 0100

FLAG WORD

S	Z	x	Ac	x	P	x	Cy
0	0	0	0	0	1	0	0

REFERENCE

1. Ramesh S.Gaonkar, "Microprocessor Architecture, Programming, and Applications", Fourth Edition, Penram International Publishing (India), 2000.
2. S.Subathra, "Microprocessor Laboratory", Record work, Adhiparashakthi Engineering College, Melmaruvathur, March 2001
3. S.Subathra, "Programming in 8085 Microprocessor and its applications - An Innovative Analysis", Technical Report, Adhiparashakthi Engineering College, Melmaruvathur, March 2003
4. Micro-85 EB, User Manual, Version - 3.0, CAT #M85 EB-002, VI Microsystems Pvt. Ltd., Chennai.
5. Micro85 simulation software, Infotech Solutions, Calcutta.