

File Edit Modify Execute Help

Data Dec Machine instructions... Ctrl+M  
Registers Microinstructions... Ctrl+Shift+M  
**Hardware Modules...** Ctrl+K

Name AC EQUs... Ctrl+E Fetch Sequence... Ctrl+T

AC 16 0  
AR 1 0  
IR 1 0  
PC 12 0  
S 1 0

**Data**

W1-0.a x

```
1 ; This program reads in integers and adds them together
2 ; until a negative number is read in. Then it outputs
3 ; the sum (not including the last number).
4
5 Start: read      ; read n -> acc
6 jmpn Done      ; jump to Done if n < 0.
7 add sum       ; add sum to the acc
8 store sum     ; store the new sum
9 jump Start    ; go back & read in next number
10 Done: load sum   ; load the final sum
11 write        ; write the final sum
12 stop         ; stop
13
14 sum: .data 2 0 ; 2-byte location where sum is stored
15
16
17
18
19 |
```

Addr Hex Data Hex

main	Addr	Data
	000	0000
	001	0000
	002	0000
	003	0000
	004	0000
	005	0000
	006	0000
	007	0000
	008	0000
	009	0000
	00A	0000
	00B	0000
	00C	0000
	00D	0000
	00E	0000
	00F	0000
	010	0000
	011	0000
	012	0000
	013	0000
	014	0000
	015	0000
	016	0000
	017	0000
	018	0000
	019	0000

Data Dec ▾

## Registers

Name	Width	Data
------	-------	------

AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

```
1 ; This program reads in integers and adds them together
2 until a negative number is read in. Then it outputs
3 the sum.
4
5 Start
6
7
8
9
10 Done
```

Edit Modules

Type of Module: Register

name	width	initial value	read-only
AC	16	0	<input type="checkbox"/>
AR	12	0	<input type="checkbox"/>
DR	16	0	<input type="checkbox"/>
E	1	0	<input type="checkbox"/>
I	1	0	<input type="checkbox"/>
IR	16	0	<input type="checkbox"/>
PC	12	0	<input type="checkbox"/>
S	1	0	<input type="checkbox"/>

New Delete Duplicate Properties... ? OK Cancel

main

Addr	Hex	Data	Hex
000	0000	0000	0000
001	0000	0000	0000
002	0000	0000	0000
003	0000	0000	0000
004	0000	0000	0000
005	0000	0000	0000
006	0000	0000	0000
007	0000	0000	0000
008	0000	0000	0000
009	0000	0000	0000
00A	0000	0000	0000
00B	0000	0000	0000
00C	0000	0000	0000
00D	0000	0000	0000
00E	0000	0000	0000
00F	0000	0000	0000
010	0000	0000	0000
011	0000	0000	0000
012	0000	0000	0000
013	0000	0000	0000
014	0000	0000	0000
015	0000	0000	0000
016	0000	0000	0000
017	0000	0000	0000
018	0000	0000	0000
019	0000	0000	0000

Data Dec ▾

## Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

```
1 ; This program reads in integers and adds them together
2 ; until a negative number is read in. Then it outputs
3 ; the sum.
```

Edit Modules

Type of Module: ConditionBit

name	register	bit	halt
CARRY-BIT	E	0	<input type="checkbox"/>
HALT-BIT	S	0	<input checked="" type="checkbox"/>

sum

14

15

16

17

18

19

New

Delete

Duplicate

Properties...

?

OK

Cancel

Addr Hex ▾

Data Hex ▾

main

Addr

Data

000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

## practile3

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

```
1 ; This program reads in integers and adds them together
2 ; until a negative number is read in. Then it outputs
3 ; the sum.
4
5 Start:
6
7
8     name          length      cellSize
9
10 Done: main           4096        16
11
12
13
14 sum:
15
16
17
18
19
```

Type of Module: RAM

New Delete Duplicate Properties... ? OK Cancel

Addr Hex ▾ Data Hex ▾

main

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practile3

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

1 ; This program reads in integers and adds them together  
2 ; until a negative number is read in. Then it outputs

Edit Microinstructions

Type of Microinstruction: TransferRtoR

name	source	srcStartBit	dest	destStartBit	numBits
AR<-IR(4-15)	IR	4	AR	0	12
AR<-PC	PC	0	AR	0	12

New Delete Duplicate

?

OK Cancel

Addr Hex Data Hex

main

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

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File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

1 ; This program reads in integers and adds them together  
2 . until a negative number is read in. Then it outputs.

Edit Microinstructions

Type of Microinstruction: MemoryAccess ▾

name	direction	memory	data	address
IR<-MAIN[AR]	read	main	IR	AR

New Delete Duplicate

?

OK Cancel

Addr Hex ▾ Data Hex ▾

main

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

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File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

1 : This program reads in integers and adds them together  
2 : until a negative number is read in. Then it outputs.

Edit Microinstructions

Type of Microinstruction: Increment

name	register	overflowBit	carryBit	delta
INCR-PC	PC	(none)	(none)	1

New Delete Duplicate

?

OK Cancel

Addr Hex ▾ Data Hex ▾

main

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

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File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

1 ; This program reads in integers and adds them together  
2 ; until a negative number is read in. Then it outputs.

Edit Microinstructions

Type of Microinstruction: Decode

name	ir
DECODE-IR	IR

New Delete Duplicate

?

OK Cancel

Addr Hex Data Hex

main

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

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File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

```
1 ; This program reads in integers and adds them together
2 ; until a negative number is read in. Then it outputs
3 ; the sum (not including the last number).
4
5 Start:
6
7
8
9
10 Done:
11
12
13
14 sum:
15
16
17
18
19
```

Edit Fetch Sequence

Fetch Sequence Implementation

- AR<-PC
- IR<-MAIN[AR]
- INCR-PC
- AR<-IR(4-15)
- DECODE-IR

MicroInstructions

- MicroInstructions
  - arithmetic
  - branch
  - decode
  - end
  - comment
  - increment
  - io
  - logical
  - memoryAccess
  - set
  - setCondBit
  - shift
  - test

OK Cancel

Addr Hex Data Hex

main

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

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File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x

1 ; This program reads in integers and adds them together  
2 ; until a negative number is read in. Then it outputs  
3 ; the sum (not including the last number).

Edit Machine Instruction

Instructions

Edit Fields

Name	Type	NumBits	DefaultVal	Relativity	Signed
REGIS...	required	16	0	absolute	<input type="checkbox"/>
ADDR	required	12	0	absolute	<input type="checkbox"/>
OP	required	4	0	absolute	<input type="checkbox"/>

All Fields

REGISTER  
ADDR  
OP

New Delete Duplicate Values...  
new dup del

OK Cancel

OK Cancel

Addr Hex ▾ Data Hex ▾

main

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

## practile3

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x add x

1 START: INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

Format Implementation

Instruction Length: 16 Opcode 0xF800

All Fields

REGISTER  
ADDR  
OP

16 REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del Edit Fields... OK Cancel ?

Addr Hex Data Hex

MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
C	16	0
R	12	0
R	16	0
I	1	0
I	1	0
R	16	0
C	12	0
I	1	0

W1-0.a x add x

1 START: INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

Format Implementation

Instruction Length: 16 Opcode 0xF400

All Fields

REGISTER ADDR OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del Edit Fields... OK Cancel

MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practile3

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x add x

1 START: INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

Format Implementation

Instruction Length: 16 Opcode 0xE001

All Fields

REGISTER ADDR OP

16 REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del Edit Fields... OK Cancel

MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practile3

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x add x

```
1 START: INP
2 STA NUM
3 INP
```

Edit Machine Instructions

Instructions

Format Implementation

Instruction Length: 16 Opcode 0x6

All Fields

REGISTER ADDR OP

4 12

OP ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP ADDR

new dup del Edit Fields... OK Cancel ?

MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practile3

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x add x

1 START: INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

Format Implementation

Instruction

Length: 16      Opcode: 0x2

All Fields

REGISTER  
ADDR  
OP

4      12

OP      ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP      ADDR

new dup del

?

OK Cancel

Addr Hex Data Hex

MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practile3

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	12
AR	12	1
DR	16	7
E	1	0
I	1	0
IR	16	-8191
PC	12	6
S	1	-1

W1-0.a x add x

```
1 START: INP
2 STA NUM
3 INP
4 ADD NUM
5 OUT
6 HALT
7
8 NUM: .data 1 0
9
```

Addr Hex Data Hex

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	2006
004	F400
005	E001
006	0007
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
A19	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 7

Enter Inputs, the first of which must be an Integer: 5

Output: 12

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

File Edit Modify Execute Help

Data Dec ▾

W1-0.a x subtract x

1 START: INP  
2 STA NUM  
3 INP

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

Edit Machine Instructions

Instructions

- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

Format Implementation

Instruction

Length: 16      Opcode: 0xE200

All Fields

- REGISTER
- ADDR
- OP

16 REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del Edit Fields... OK Cancel

MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

practice4

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	0
DR	16	0
E	1	0
I	1	0
IR	16	0
PC	12	0
S	1	0

W1-0.a x subtract x

```
1 START: INP
2 STA NUM
3 INP
```

Edit Machine Instructions

Instructions

Format Implementation

INC

CMA

ADD

STA

HLT

OUT

INP

Instruction

Length: 16

Opcode: 0xE020

16

REGISTER

All Fields

REGISTER

ADDR

OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del

?

OK Cancel

MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000

practicle4

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	6
AR	12	1
DR	16	8
E	1	-1
I	1	0
IR	16	-8191
PC	12	8
S	1	-1

subtract x

```
1 START: INP
2 STA NUM
3 INP
4 CMA
5 INC
6 ADD NUM
7 OUT
8 HALT
9
10 NUM: .data 1 0
11
```

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	6008
002	F800
003	E200
004	E020
005	2008
006	F400
007	E001
008	0008
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 8

Enter Inputs, the first of which must be an Integer: 2

Output: 6

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practice5

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	0
AR	12	1
DR	16	1
E	1	0
I	1	0
IR	16	-8191
PC	12	6
S	1	-1

and x

1 INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

Format Implementation

Instruction Length: 16 Opcode 0x0

All Fields

REGISTER ADDR OP

4 12

OP ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP ADDR

new dup del

?

OK Cancel

Addr Hex Data Hex

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	0006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000

\*practicel5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	0
AR	12	1
DR	16	1
E	1	0
I	1	0
IR	16	-8191
PC	12	6
S	1	-1

and x

```
1 INP
2 STA NUM
3 INP
4 AND NUM
5 OUT
6 HLT
7
8 NUM: .data 1 0
```

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	0006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 1

Enter Inputs, the first of which must be an Integer: 0

Output: 0

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practice5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	1
AR	12	1
DR	16	1
E	1	0
I	1	0
IR	16	-8191
PC	12	6
S	1	-1

OR x

1 INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

Format Implementation

Instruction

Length: 16      Opcode: 0x1

4      12

OP ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

All Fields

REGISTER  
ADDR  
OP

Assembly

OP ADDR

new dup del

?

OK Cancel

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	1006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice5

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
AC	16	1
AR	12	1
DR	16	1
E	1	0
I	1	0
IR	16	-8191
PC	12	6
S	1	-1

OR x

```
1 INP
2 STA NUM
3 INP
4 OR NUM
5 OUT
6 HLT
7
8 NUM: .data 1 0
9
```

Addr Hex

Data Hex

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	1006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 1

Enter Inputs, the first of which must be an Integer: 0

Output: 1

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practicel5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	-2047
AR	12	1
DR	16	-2048
E	1	0
I	1	0
IR	16	-8191
PC	12	4
S	1	-1

NOT x  
1 INP  
2 NOT  
3 OUT

Edit Machine Instructions

Instructions

- NAND
- XOR
- NOT**
- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

Format Implementation

Instruction Length: 16      Opcode 0x2000

All Fields

REGISTER
ADDR
OP

16

REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del

?

OK Cancel

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	2000
002	F400
003	E001
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
AC	16	-2047
AR	12	1
DR	16	-2048
E	1	0
I	1	0
IR	16	-8191
PC	12	4
S	1	-1

NOT x

1 INP  
2 NOT  
3 OUT  
4 HALT  
5

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	2000
002	F400
003	E001
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 1

Output: -2047

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practice5

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
PC	12	6
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	1
DR	16	1
IR	16	-8191

NOT x XOR x NOR x NAND x

1 INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

- NOR
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

Format Implementation

Instruction

Length: 16      Opcode



To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly



All Fields

REGISTER

ADDR

OP

Edit Fields...

OK

Cancel

Addr Hex Data Hex

MAIN

Addr Data

000	F800
001	6006
002	F800
003	3006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice5

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
PC	12	6
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	1
DR	16	1
IR	16	-8191

NOT X XOR X NOR X NAND X

```
1 INP
2 STA NUM
3 INP
4 XOR NUM
5 OUT
6 HLT
7
8 NUM: .data 1 0
9
```

Addr Hex Data Hex

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	3006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 1

Enter Inputs, the first of which must be an Integer: 0

Output: 1

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practice5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	6
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	1
DR	16	1
IR	16	-8191

NOT × XOR × NOR × NAND ×

1 INP  
2 STA\_NUM  
3 INP

Edit Machine Instructions

Instructions

- NOR
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

Format Implementation

Instruction

Length: 16      Opcode

All Fields

REGISTER  
ADDR  
OP

4      12

OP ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP ADDR

new dup del

?

OK Cancel

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	3006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practicle5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	6
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	-1
DR	16	0
IR	16	-8191

NOT × XOR × NOR × NAND ×

```
1 INP
2 STA NUM
3 INP
4 NOR NUM
5 OUT
6 HLT
7
8 NUM: .data 1 0
9
```

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	4006
004	F400
005	E001
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 0

Enter Inputs, the first of which must be an Integer: 0

Output: -1

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practicel5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	6
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	-1
DR	16	0
IR	16	-8191

NOT X XOR X NOR X NAND X

1 INP  
2 STA NUM  
3 INP

Edit Machine Instructions

Instructions

- NOR
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

Format Implementation

Instruction

Length: 16      Opcode: 0x4

All Fields

REGISTER  
ADDR  
OP

4      12

OP ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP ADDR

new dup del

?

OK Cancel

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	4006
004	F400
005	E001
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice5

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	6
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	-1
DR	16	1
IR	16	-8191

NOT X XOR X NOR X NAND X

```
1 INP
2 STA NUM
3 INP
4 NAND NUM
5 OUT
6 HLT
7
8 NUM: .data 1 0
9
```

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	5006
004	F400
005	E001
006	0001
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 1

Enter Inputs, the first of which must be an Integer: 0

Output: -1

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practice6

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	6
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	10
DR	16	5
IR	16	-8191

sta x  
1 INP  
2 STA NUM  
3 OUT

Edit Machine Instructions

Instructions

MULTIPLY NOR NAND XOR NOT OR AND INC CMA ADD STA HLT OUT INP

Format Implementation

Instruction Length: 16 Opcode 0x6

4 12

OP ADDR

To add fields, drag them in from the list of fields on the right. To delete fields, drag them out away from the other fields.

All Fields

REGISTER ADDR OP

Assembly

OP ADDR

Edit Fields... OK Cancel

MAIN

Addr	Data
000	F800
001	6006
002	F800
003	7006
004	F400
005	E001
006	0005
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice6

File Edit Modify Execute Help

Name	Width	Data
PC	12	4
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	25
DR	16	0
IR	16	-8191

sta x

```
1 INP
2 STA NUM
3 OUT
4 HLT
5
6 NUM: .data 1 0
```

Addr	Hex	Data
000	F800	
001	6004	
002	F400	
003	E001	
004	0019	
005	0000	
006	0000	
007	0000	
008	0000	
009	0000	
00A	0000	
00B	0000	
00C	0000	
00D	0000	
00E	0000	
00F	0000	
010	0000	
011	0000	
012	0000	
013	0000	
014	0000	
015	0000	
016	0000	
017	0000	
018	0000	
019	0000	

EXECUTING...

Enter Inputs, the first of which must be an Integer: 25

Output: 25

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practice6

File Edit Modify Execute Help

Data Dec

Name	Width	Data
PC	12	4
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	25
DR	16	0
IR	16	-8191

**Edit Machine Instructions**

Instructions: LDA

Format Implementation

Instruction: Length: 16 Opcode: 0x4

All Fields: REGISTER, ADDR, OP

OP: 4, ADDR: 12

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly: OP ADDR

new dup del Edit Fields... OK Cancel

MAIN

Addr	Data
000	F800
001	6004
002	F400
003	E001
004	0019
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice6

File Edit Modify Execute Help

Name	Width	Data
PC	12	5
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	5
DR	16	5
IR	16	-8191

LDA x

```
1 INP
2 STA NUM
3 LDA NUM
4 OUT
5 HLT
6
7 NUM: .data 1 0
```

Addr	Hex	Data
000	F800	
001	6005	
002	4005	
003	F400	
004	E001	
005	0005	
006	0000	
007	0000	
008	0000	
009	0000	
00A	0000	
00B	0000	
00C	0000	
00D	0000	
00E	0000	
00F	0000	
010	0000	
011	0000	
012	0000	
013	0000	
014	0000	
015	0000	
016	0000	
017	0000	
018	0000	
019	0000	

EXECUTING...
Enter Inputs, the first of which must be an Integer: 5
Output: 5
EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

Data Dec ▾

## Registers

Name	Width	Data
PC	12	5
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	5
DR	16	5
IR	16	-8191

LDA x \*BUN x

- 1 INP
- 2 BUN K
- 3 INP

Edit Machine Instructions

Instructions

- BUN
- LDA
- MULTIPLY
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT
- INP

new dup del

Format Implementation

Instruction

Length: 16      Opcode: 0x8

4      12

OP ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP ADDR

Edit Fields... OK Cancel

Addr Hex ▾ Data Hex ▾

## MAIN

Addr	Data
000	F800
001	6005
002	4005
003	F400
004	E001
005	0005
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice6

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	5
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	9
DR	16	0
IR	16	-8191

LDA x BUN x

1 INP  
2 BON K  
3 INP  
4 K: OUT  
5 HLT  
6

Addr Hex ▾ Data Hex ▾

MAIN

Addr	Data
000	F800
001	8003
002	F800
003	F400
004	E001
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 9

Output: 9

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practicle6

File Edit Modify Execute Help

Data Dec

Registers

Name	Width	Data
PC	12	5
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	9
DR	16	0
IR	16	-8191

ISZ x  
1 ISZ 009  
2 OUT  
3 HLT

Edit Machine Instructions

Instructions

- ISZ
- BUN
- LDA
- MULTIPLY
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT
- OUT

Format Implementation

Instruction Length: 16 Opcode 0xC

All Fields

REGISTER  
ADDR  
OP

4 12

OP ADDR

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP ADDR

Edit Fields... OK Cancel

MAIN

Addr	Data
000	F800
001	8003
002	F800
003	F400
004	E001
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

\*practice6

File Edit Modify Execute Help

Name	Width	Data
PC	12	3
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	0
DR	16	1
IR	16	-8191

Registers

ISZ x

```
1 ISZ 009
2 OUT
3 HLT
4
```

Addr	Hex	Data
000	C009	0009
001	F400	110000000000
002	E001	111000000001
003	0000	000000000000
004	0000	000000000000
005	0000	000000000000
006	0000	000000000000
007	0000	000000000000
008	0000	000000000000
009	0001	000000000001
00A	0000	000000000000
00B	0000	000000000000
00C	0000	000000000000
00D	0000	000000000000
00E	0000	000000000000
00F	0000	000000000000
010	0000	000000000000
011	0000	000000000000
012	0000	000000000000
013	0000	000000000000
014	0000	000000000000
015	0000	000000000000
016	0000	000000000000
017	0000	000000000000
018	0000	000000000000
019	0000	000000000000

EXECUTING...

Output: 0

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

Data Bin

## Registers

	Name	Width	Data
PC		12	0000 0000 0000
AR		12	0000 0000 0000
E		1	0
I		1	0
S		1	0
AC		16	0000 0000 0000 0000
DR		16	0000 0000 0000 0000
IR		16	0000 0000 0000 0000

Edit Machine Instructions

Instructions

CME  
CLA  
ISZ  
BUN  
LDA  
MULTIPLY  
NAND  
XOR  
NOT  
OR  
AND  
INC  
**CMA**  
ADD  
CTA

Format Implementation

Instruction Length: 16      Opcode **0xE200**

16      REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

All Fields

REGISTER  
ADDR  
OP

new dup del

OK Cancel

Addr	Dec	Data	Dec
<b>MAIN</b>			
0		0	
1		0	
2		0	
3		0	
4		0	
5		0	
6		0	
7		0	
8		0	
9		0	
10		0	
11		0	
12		0	
13		0	
14		0	
15		0	
16		0	
17		0	
18		0	
19		0	
20		0	
21		0	
22		0	
23		0	
24		0	
25		0	

## \*PRACTICLE 7

File Edit Modify Execute Help

Data Bin ▾

## Registers

Name	Width	Data
PC	12	0000 0000 0010
AR	12	0000 0000 0001
E	1	0
I	1	0
S	1	1
AC	16	1111 1111 1111 1111
DR	16	0000 0000 0000 0000
IR	16	1110 0000 0000 0001

## CMA x

1 CMA  
2 HLT  
3

## MAIN

Addr	Dec ▾	Data	Dec ▾
0		57856	
1		57345	
2		0	
3		0	
4		0	
5		0	
6		0	
7		0	
8		0	
9		0	
10		0	
11		0	
12		0	
13		0	
14		0	
15		0	
16		0	
17		0	
18		0	
19		0	
20		0	
21		0	
22		0	
23		0	
24		0	
25		0	

EXECUTING...

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

File Edit Modify Execute Help

Data Dec ▾ Addr Dec ▾ Data Dec ▾

Registers

Name	Width	Data
PC	12	2
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	45
DR	16	0
IR	16	-8191

CMA x CLA x  
1 CLA  
2 HLT

Edit Machine Instructions

Instructions

- CME
- CLA**
- ISZ
- BUN
- LDA
- MULTIPLY
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD
- CTA

Format Implementation

Instruction Length: 16      Opcode **0xE800**

All Fields

REGISTER  
ADDR  
OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

Edit Fields... OK Cancel

MAIN

Addr	Data
0	57856
1	57345
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

\*PRACTICLE 7

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	2
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	0
DR	16	0
IR	16	-8191

CMA x CLA x

1 CLA
2 HLT

Addr Dec ▾ Data Dec ▾

MAIN

Addr	Data
0	59392
1	57345
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...  
EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*PRACTICE 7

File Edit Modify Execute Help

Data Bin

Registers

Name	Width	Data
PC	12	0000 0000 0000
AR	12	0000 0000 0000
E	1	0
I	1	0
S	1	0
AC	16	0000 0000 0000 0000
DR	16	0000 0000 0000 0000
IR	16	0000 0000 0000 0000

CMA x CLA x \*Untitled x

1 CME  
2 HLT

Edit Machine Instructions

Instructions

CME

CLA

ISZ

BUN

LDA

MULTIPLY

NAND

XOR

NOT

OR

AND

INC

CMA

ADD

CTA

Format Implementation

Instruction

Length: 16      Opcode: 0xE100

16

REGISTER

All Fields

REGISTER

ADDR

OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

OK Cancel

MAIN

Addr Data

Addr	Data
0	0
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

## \*PRACTICLE 7

File Edit Modify Execute Help

Data Bin

## Registers

Name	Width	Data
PC	12	0000 0000 0010
AR	12	0000 0000 0001
E	1	1
I	1	0
S	1	1
AC	16	0000 0000 0000 0000
DR	16	0000 0000 0000 0000
IR	16	1110 0000 0000 0001

CME x HLT x

1 CME  
2 HLT  
3

Addr Dec Data Dec

## MAIN

Addr	Data
0	57600
1	57345
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*PRACTICE 7

File Edit Modify Execute Help

Data Bin

Registers

Name	Width	Data
PC	12	0000 0000 0010
AR	12	0000 0000 0001
E	1	1
I	1	0
S	1	1
AC	16	0000 0000 0000 0000
DR	16	0000 0000 0000 0000
IR	16	1110 0000 0000 0001

CME x HLT x

1 HLT

Edit Machine Instructions

Instructions

- BNR
- LDA
- MULTIPLY
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD
- STA
- HLT**
- OUT
- INP

Format Implementation

Instruction Length: 16 Opcode **0xE001**

16 REGISTER

All Fields

- REGISTER
- ADDR
- OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

OK Cancel Edit Fields...

MAIN

Addr	Dec	Data
0	57600	
1	57345	
2	0	
3	0	
4	0	
5	0	
6	0	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	
13	0	
14	0	
15	0	
16	0	
17	0	
18	0	
19	0	
20	0	
21	0	
22	0	
23	0	
24	0	
25	0	

## \*PRACTICE 7

File Edit Modify Execute Help

Data Bin

## Registers

Name	Width	Data
PC	12	0000 0000 0001
AR	12	0000 0000 0001
E	1	0
I	1	0
S	1	1
AC	16	0000 0000 0000 0000
DR	16	0000 0000 0000 0000
IR	16	1110 0000 0000 0001

CME x HLT x

1 HLT

Addr Dec Data Dec

## MAIN

Addr	Data
0	57345
1	0
2	0
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

## \*PRACTICE 7

File Edit Modify Execute Help

Data Dec ▾

Registers		
Name	Width	Data
PC	12	0
AR	12	0
E	1	0
I	1	0
S	1	0
AC	16	0
DR	16	0
IR	16	0

INC x  
1 INP  
2 INC  
3 OUT

Edit Machine Instructions

Instructions

CME  
CLA  
ISZ  
BUN  
LDA  
MULTIPLY  
NAND  
XOR  
NOT  
OR  
AND  
**INC**  
CMA  
ADD  
CTA

Format Implementation

Instruction Length: 16      Opcode **0xE020**

16 REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

All Fields

REGISTER  
ADDR  
OP

Assembly

REGISTER

OK Cancel

Addr Dec ▾ Data Dec ▾

MAIN	Addr	Data
0	0	0
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0
13	0	0
14	0	0
15	0	0
16	0	0
17	0	0
18	0	0
19	0	0
20	0	0
21	0	0
22	0	0
23	0	0
24	0	0
25	0	0

## \*PRACTICLE 7

File Edit Modify Execute Help

Name	Width	Data
PC	12	4
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	9
DR	16	0
IR	16	-8191

## INC X

```
1 INP  
2 INC  
3 OUT  
4 HLT  
5
```

Addr Dec ▾ Data Dec ▾

## MAIN

Addr	Data
0	63488
1	57376
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...

Enter Inputs, the first of which must be an Integer: 8

Output: 9

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*PRACTICE8

File Edit Modify Execute Help

Data Dec ▾

Registers

Name	Width	Data
PC	12	4
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	-5
DR	16	0
IR	16	-8191

SPA X

1 INP  
2 SPA  
3 OUT

Edit Machine Instructions

Instructions

- SPA
- CME
- CLA
- ISZ
- BUN
- LDA
- MULTIPLY
- NAND
- XOR
- NOT
- OR
- AND
- INC
- CMA
- ADD

Format Implementation

Instruction

Length: 16      Opcode: 0xE010

16

REGISTER

All Fields

REGISTER  
ADDR  
OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del

?

OK Cancel

Addr Dec ▾ Data Dec ▾

MAIN

Addr	Data
0	63488
1	57360
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

Name	Width	Data
PC	12	4
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	-5
DR	16	0
IR	16	-8191

Registers

SP	A	X
1	INP	
2	SPA	
3	CUT	
4	HLT	
5		

MAIN	Addr	Data
0		63488
1		57360
2		62464
3		57345
4		0
5		0
6		0
7		0
8		0
9		0
10		0
11		0
12		0
13		0
14		0
15		0
16		0
17		0
18		0
19		0
20		0
21		0
22		0
23		0
24		0
25		0

EXECUTING...

Enter Inputs, the first of which must be an Integer: -5

Output: -5

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

## \*PRACTICE8

File Edit Modify Execute Help

Data Dec

Registers

	Name	Width	Data
PC		12	4
AR		12	1
E		1	0
I		1	0
S		1	-1
AC		16	-5
DR		16	0
IR		16	-8191

SNA x

- 1 INP
- 2 SNA
- 3 OUT

- Edit Machine Instructions
- Instructions
- SNA
  - SPA
  - CME
  - CLA
  - ISZ
  - BUN
  - LDA
  - MULTIPLY
  - NAND
  - XOR
  - NOT
  - OR
  - AND
  - INC
  - CMA
- new dup del

Format Implementation

Instruction

Length: 16      Opcode: 0xE008

All Fields

REGISTER  
ADDR  
OP

16

REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

Edit Fields...

OK

Cancel

Addr Dec

Data Dec

MAIN

Addr

Data

0	63488
1	57360
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

## \*PRACTICE8

File Edit Modify Execute Help

Data Dec ▾

## Registers

Name	Width	Data
PC	12	4
AR	12	1
E	1	0
I	1	0
S	1	-1
AC	16	9
DR	16	0
IR	16	-8191

SNA X

- 1 INP
- 2 SNA
- 3 OUT
- 4 HLT
- 5

Addr Dec ▾ Data Dec ▾

## MAIN

Addr	Data
0	63488
1	57352
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...

Enter Inputs, the first of which must be an Integer: 9

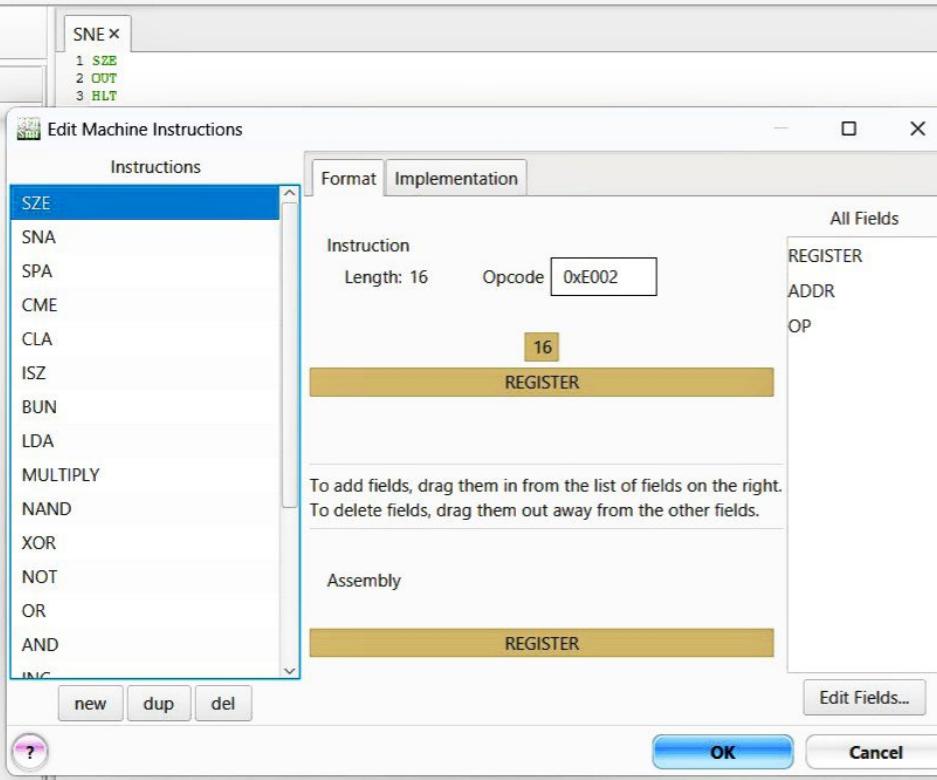
Output: 9

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

Data Dec ▾

## Registers

	Name	Width	Data
PC		12	4
AR		12	1
E		1	0
I		1	0
S		1	-1
AC		16	9
DR		16	0
IR		16	-8191



Addr Dec ▾ Data Dec ▾

## MAIN

Addr	Data
0	63488
1	57352
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

\*PRACTICLE8

File Edit Modify Execute Help

Data Hex ▾

Registers

Name	Width	Data
PC	12	003
AR	12	001
E	1	0
I	1	0
S	1	1
AC	16	0000
DR	16	0000
IR	16	E001

SNE X

1 SZE
2 OUT
3 HLT

Addr Dec ▾ Data Dec ▾

MAIN

Addr	Data
0	57346
1	62464
2	57345
3	0
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...  
EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

PRACTICE 9

File Edit Modify Execute Help

Data Hex ▾

Registers		
Name	Width	Data
PC	12	004
AR	12	001
E	1	0
I	1	0
S	1	1
AC	16	0002
DR	16	0000
IR	16	E001

CIR x  
1 :circulate right  
2 INP  
3 CIR

Edit Machine Instructions

Instructions

- CIR**
- SZE
- SNA
- SPA
- CME
- CLA
- ISZ
- BUN
- LDA
- MULTIPLY
- NAND
- XOR
- NOT
- OR
- AND

Format Implementation

Instruction  
Length: 16      Opcode: 0xE080

16  
REGISTER

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly  
REGISTER

All Fields

REGISTER  
ADDR  
OP

new dup del

?

OK Cancel

Addr Dec ▾ Data Dec ▾

MAIN

Addr	Data
0	63488
1	57472
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

## \*PRACTICLE 9

File Edit Modify Execute Help

Data Hex ▾

## Registers

Name	Width	Data
PC	12	004
AR	12	001
E	1	0
I	1	0
S	1	1
AC	16	0003
DR	16	0000
IR	16	E001

## CIR X

```
1 ;circulate right
2 INP
3 CIR
4 OUT
5 HLT
6
```

Addr Dec ▾ Data Dec ▾

## MAIN

Addr	Data
0	63488
1	57472
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...

Enter Inputs, the first of which must be an Integer: 6

Output: 3

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*PRACTICLE 9

File Edit Modify Execute Help

Data Hex

Registers

Name	Width	Data
PC	12	004
AR	12	001
E	1	0
I	1	0
S	1	1
AC	16	0003
DR	16	0000
IR	16	E001

CIR X CIL X

1 ;circulate left  
2 INP  
3 CIL

Edit Machine Instructions

Instructions

CIL

CIR

SZE

SNA

SPA

CME

CLA

ISZ

BUN

LDA

MULTIPLY

NAND

XOR

NOT

OP

Format Implementation

Instruction Length: 16 Opcode 0xE040

All Fields

REGISTER

ADDR

OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

REGISTER

new dup del

?

OK Cancel

MAIN

Addr	Dec	Data
0	63488	
1	57472	
2	62464	
3	57345	
4	0	
5	0	
6	0	
7	0	
8	0	
9	0	
10	0	
11	0	
12	0	
13	0	
14	0	
15	0	
16	0	
17	0	
18	0	
19	0	
20	0	
21	0	
22	0	
23	0	
24	0	
25	0	

## \*PRACTICE 9

File Edit Modify Execute Help

Data Hex ▾

## Registers

Name	Width	Data
PC	12	004
AR	12	001
E	1	0
I	1	0
S	1	1
AC	16	0008
DR	16	0000
IR	16	E001

CIR x CIL x

```
1 ;circulate left
2 INP
3 CIL
4 OUT
5 HLT
```

Addr Dec ▾ Data Dec ▾

## MAIN

Addr	Data
0	63488
1	57408
2	62464
3	57345
4	0
5	0
6	0
7	0
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

EXECUTING...

Enter Inputs, the first of which must be an Integer: 4

Output: 8

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

\*practice11

File Edit Modify Execute Help

Data Hex Registers

Name	Width	Data
PC	12	008
AR	12	001
E	1	0
I	1	0
S	1	1
AC	16	0000
DR	16	0000
IR	16	E001

practice 11 x  
1 ; This program will take input of integers and add them  
2 ; until a negative number is encountered.  
3

Edit Machine Instructions

Instructions

JMPN JUMP CIR SZE SNA SPA CME CLA ISZ BUN LDA MULTIPLY NAND XOR NOT

Format Implementation

Instruction Length: 16 Opcode 0x9

4 12

OP UNUSED

All Fields UNUSED REGISTER ADDR OP

To add fields, drag them in from the list of fields on the right.  
To delete fields, drag them out away from the other fields.

Assembly

OP UNUSED

OK Cancel

MAIN

Addr	Data
0	63488
1	40965
2	8200
3	24584
4	36864
5	16392
6	62464
7	57345
8	0
9	0
10	0
11	0
12	0
13	0
14	0
15	0
16	0
17	0
18	0
19	0
20	0
21	0
22	0
23	0
24	0
25	0

## Practical11

File Edit Modify Execute Help

Data Hex

Registers

Name	Width	Data
AC	16	000D
AR	12	000
DR	16	000D
IR	16	5000
PC	12	008
S	1	1

## Practical11.a X

```

1 ; This program will take input of integers and add them
2 ; until a negative number is encountered.

3
4 START: READ           ; read input
5
6 JMPN DONE            ; if n < 0 then jump to DONE
7
8 ADD SUM              ; add to sum
9
10 STA SUM              ; store sum
11
12 JUMP START           ; jump to start to read again
13
14
15 DONE: LDA SUM        ; load final sum
16
17 WRITE                ; display contents of sum
18
19 STOP                 ; halt
20
21 SUM: .data 2 0        ; 2-byte sum initialized to 0
22

```

## MAIN

Addr	Data
000	0000
001	7005
002	4008
003	3008
004	6000
005	2008
006	1000
007	5000
008	000D
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000

EXECUTING...

Enter Inputs, the first of which must be an Integer: 2

Enter Inputs, the first of which must be an Integer: 4

Enter Inputs, the first of which must be an Integer: 6

Enter Inputs, the first of which must be an Integer: 1

Enter Inputs, the first of which must be an Integer: -4

Output: 13

EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]

## Practical12

File Edit Modify Execute Help

Data Hex

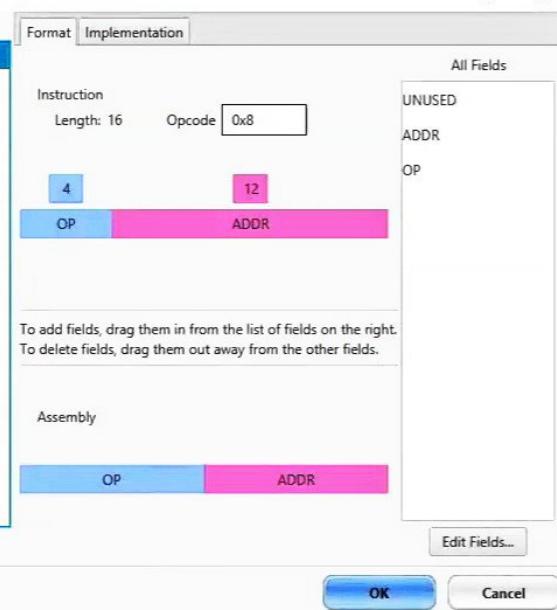
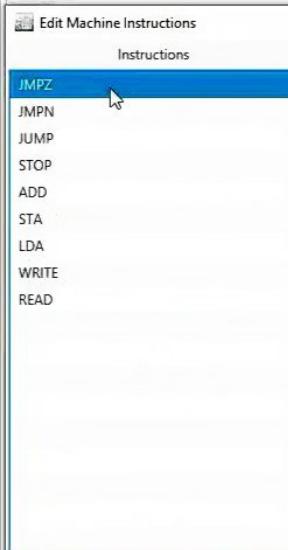
## Registers

Name	Width	Data
AC	16	0000
AR	12	000
DR	16	0000
IR	16	0000
PC	12	000
S	1	0

Practical11.a X Practical12.a X

```
1 ; This program will take input of integers and add them
2 ; until zero is encountered.
```

```
3
4 START: READ ; read input
5
```



Addr Hex Data Hex

## MAIN

Addr	Data
000	0000
001	0000
002	0000
003	0000
004	0000
005	0000
006	0000
007	0000
008	0000
009	0000
00A	0000
00B	0000
00C	0000
00D	0000
00E	0000
00F	0000
010	0000
011	0000
012	0000
013	0000
014	0000
015	0000
016	0000
017	0000
018	0000
019	0000

## Practical12

File Edit Modify Execute Help

	Name	Width	Data
AC	16	000D	
AR	12	000	
DR	16	000D	
IR	16	5000	
PC	12	008	
S	1	1	

```
Practical11.a X Practical12.a X
1 ; This program will take input of integers and add them
2 ; until zero is encountered.
3
4 START: READ           ; read input
5
6 JMPZ DONE            ; if n = 0 then jump to DONE
7
8 ADD SUM              ; add to sum
9
10 STA SUM              ; store sum
11
12 JUMP START           ; jump to start to read again
13
14
15 DONE: LDA SUM        ; load final sum
16
17 WRITE                ; display contents of sum
18
19 STOP                 ; halt
20
21 SUM: .data 2 0        ; 2-byte sum initialized to 0
22
```

MAIN	Addr	Data
	000	0000
	001	8005
	002	4008
	003	3008
	004	6000
	005	2008
	006	1000
	007	5000
	008	000D
	009	0000
	00A	0000
	00B	0000
	00C	0000
	00D	0000
	00E	0000
	00F	0000
	010	0000
	011	0000
	012	0000
	013	0000
	014	0000
	015	0000
	016	0000
	017	0000
	018	0000

EXECUTING...  
Enter Inputs, the first of which must be an Integer: 4  
Enter Inputs, the first of which must be an Integer: 3  
Enter Inputs, the first of which must be an Integer: 5  
Enter Inputs, the first of which must be an Integer: -2 I  
Enter Inputs, the first of which must be an Integer: -6  
Enter Inputs, the first of which must be an Integer: 9  
Enter Inputs, the first of which must be an Integer: 0  
Output: 13  
EXECUTION HALTED NORMALLY due to the setting of the bit(s): [HALT-BIT]