

1. press Load Program 1 button to start and load the program1.txt to memory.

Machine Simulator

GPR 00LD

GPR 10LD

GPR 20LD

GPR 310100LD

IXR 10LD

IXR 21100100LD

IXR 31111101000LD

PC1LD

MAR1100100LD

MBR10100LD

IR11110000000

MFR0

Privileged

Keyboard0

Printer0

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

0

Operation

GPR

IXR

I

Address

Halt

Run

Store

SS

Load

IPL

Load Program 1

Run single instruction

Input

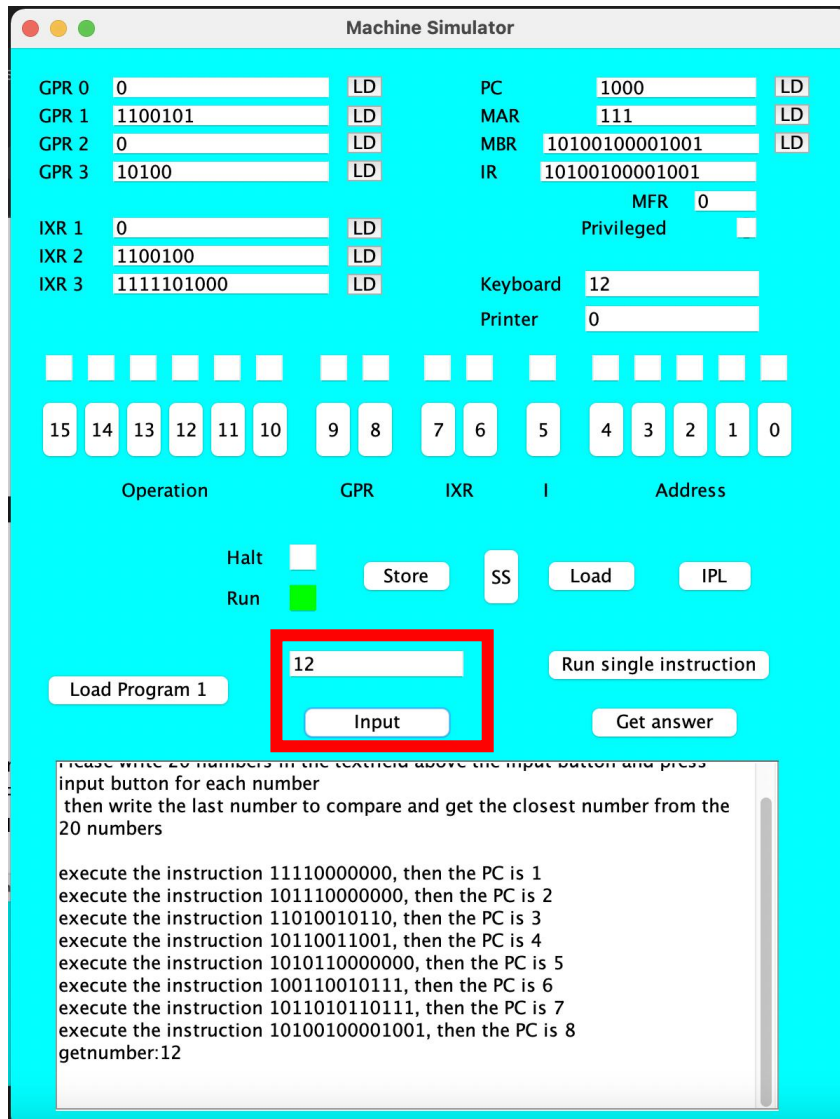
Get answer

Now the program1 has been loaded to the memory.
Please write 20 numbers in the textfield above the input button and press input button for each number
then write the last number to compare and get the closest number from the 20 numbers

execute the instruction 11110000000, then the PC is 1

2. Run program 1

1) Please write 20 numbers in the textfield above the input button and press input button for each number. (20 numbers should be non-negative and less than 65536)



The image shows a 'Machine Simulator' window with a cyan background. At the top, it has a title bar with three colored circles (red, yellow, green) and the text 'Machine Simulator'. Below the title bar, there are several registers and their values:

- GPR 0: 0, LD
- GPR 1: 1100101, LD
- GPR 2: 0, LD
- GPR 3: 10100, LD
- IXR 1: 0, LD
- IXR 2: 1100100, LD
- IXR 3: 1111101000, LD
- PC: 1000, LD
- MAR: 111, LD
- MBR: 10100100001001, LD
- IR: 10100100001001
- MFR: 0
- Privileged: ☐

Below the registers, there are two input fields: 'Keyboard' with the value '12' and 'Printer' with the value '0'. Underneath these are two rows of 16 small white squares, each containing a number from 15 down to 0. Below the squares are five labels: 'Operation', 'GPR', 'IXR', 'I', and 'Address'. In the center, there are four buttons: 'Store', 'SS', 'Load', and 'IPL'. To the left of these buttons are two checkboxes: 'Halt' (unchecked) and 'Run' (checked). Below the buttons, there is a red rectangular box containing a text input field with the value '12' and an 'Input' button. To the left of the red box is a 'Load Program 1' button. To the right of the red box is a 'Run single instruction' button. Below the red box is a 'Get answer' button. At the bottom of the window, there is a text area with the following text:

Please write 20 numbers in the textfield above the input button and press input button for each number
then write the last number to compare and get the closest number from the 20 numbers

execute the instruction 11110000000, then the PC is 1
execute the instruction 101110000000, then the PC is 2
execute the instruction 11010010110, then the PC is 3
execute the instruction 10110011001, then the PC is 4
execute the instruction 1010110000000, then the PC is 5
execute the instruction 100110010111, then the PC is 6
execute the instruction 1011010110111, then the PC is 7
execute the instruction 10100100001001, then the PC is 8
getnumber:12

2) After inputting 20 numbers, write the last number to compare with these 20 numbers.

Machine Simulator

GPR 0 LD

GPR 1 LD

GPR 2 LD

GPR 3 LD

IXR 1 LD

IXR 2 LD

IXR 3 LD

PC LD

MAR LD

MBR LD

IR

MFR

Privileged ☐

Keyboard

Printer

15

14

13

12

11

10

9

8

7

6

5

4

3

2

1

0

Operation
GPR
IXR
I
Address

Halt ☐

Run ☒

Store

SS

Load

IPL

execute the instruction 100110010111, then the PC is 0

execute the instruction 101010110111, then the PC is 7

execute the instruction 11101100000001, then the PC is 8

getnumber:58

Now the memory has 20 numbers:

10 11 12 13 14 15 16 17 18 19 20 50 51 52 53 54 55 56 57 58

Please enter another number to compare and get the closest number

execute the instruction 1100011000000000, then the PC is 9

execute the instruction 101010010110, then the PC is 10

get compare number:30

please click the button Run single instruction

Or click button Get answer to get the result directly

3) After inputting the target number, please click the button Run single instruction to run instructions one by one,
or click button Get answer to get the result directly. (The reach the end, the loop will execute more than 100 instructions)

Machine Simulator

GPR 0	0	LD	PC	10110	LD
GPR 1	1100101	LD	MAR	1111110	LD
GPR 2	10100	LD	MBR	10100	LD
GPR 3	10100	LD	IR	101010011010	LD
IXR 1	0	LD	MFR	0	
IXR 2	1100100	LD	Privileged	<input type="checkbox"/>	
IXR 3	1111101000	LD	Keyboard	30	
			Printer	0	

☐ 15
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1
0

Operation
GPR
IXR
I
Address

Halt ☐
 Run ☒

Store ☐ SS ☐ Load ☐ IPL ☐

Load Program 1

execute the instruction 1100011000000000, then the PC is 9
get compare number:30
please click the button Run single instruction
Or click button Get answer to get the result directly
execute the instruction 111100000000, then the PC is 11
execute the instruction 101110000000, then the PC is 12
execute the instruction 11010010110, then the PC is 13
execute the instruction 10110011001, then the PC is 14
execute the instruction 1010110000000, then the PC is 15
execute the instruction 100110010111, then the PC is 16
execute the instruction 101101011011, then the PC is 17
execute the instruction 10100100010011, then the PC is 18
execute the instruction 10110000010101, then the PC is 21
execute the instruction 101010011010, then the PC is 22

Machine Simulator

GPR 0	10100	LD	PC	100001	LD
GPR 1	1111000	LD	MAR	100000	LD
GPR 2	10010	LD	MBR	0	LD
GPR 3	0	LD	IR	0	LD
IXR 1	0	LD	MFR	0	
IXR 2	1100100	LD	Privileged	<input type="checkbox"/>	
IXR 3	1111101000	LD	Keyboard	30	
			Printer	20	

☐ 15
14
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12
11
10
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3
2
1
0

Operation
GPR
IXR
I
Address

Halt ☒
 Run ☐

Store ☐ SS ☐ Load ☐ IPL ☐

Load Program 1

execute the instruction 10100100010011, then the PC is 20
execute the instruction 11010110111, then the PC is 20
execute the instruction 1011010010110, then the PC is 21
execute the instruction 101010011010, then the PC is 22
execute the instruction 1011010011000, then the PC is 23
execute the instruction 10100100011001, then the PC is 24
execute the instruction 10110000011101, then the PC is 29
execute the instruction 1101100001011, then the PC is 30
execute the instruction 10010010101, then the PC is 31
execute the instruction 1100100000000001, then the PC is 32
execute the instruction 0, then the PC is 33

The 20 numbers are:
10 11 12 13 14 15 16 17 18 19 20 50 51 52 53 54 55 56 57 58
The closest number to 30 is in device1 printer, which is 20

4) When inputting the 20 numbers and target number, the changes of device0(Keyboard) can be seen in the panel. And the result will be in the device1(printer) at the end.

Machine Simulator

GPR 0	10100	LD	PC	100001	LD
GPR 1	1111000	LD	MAR	100000	LD
GPR 2	10010	LD	MBR	0	LD
GPR 3	0	LD	IR	0	
IXR 1	0	LD	MFR	0	
IXR 2	1100100	LD	Privileged	<input type="checkbox"/>	
IXR 3	111101000	LD			

Keyboard 30
 Printer 20

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Operation				GPR		IXR		I		Address					

Halt ☒ ☐ Run
 Store SS Load IPL

Load Program 1 30 Run single instruction

Input Get answer

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execute the instruction 10100100010011, then the PC is 19
execute the instruction 11010110111, then the PC is 20
execute the instruction 1011010010110, then the PC is 21
execute the instruction 101010011010, then the PC is 22
execute the instruction 1011010011000, then the PC is 23
execute the instruction 10100100011001, then the PC is 24
execute the instruction 10110000011101, then the PC is 29
execute the instruction 11101100001011, then the PC is 30
execute the instruction 10010010101, then the PC is 31
execute the instruction 1100100000000001, then the PC is 32
execute the instruction 0, then the PC is 33

The 20 numbers are:
10 11 12 13 14 15 16 17 18 19 20 50 51 52 53 54 55 56 57 58
The closest number to 30 is in device1 printer, which is 20
  
```