Assembly Language Lecture Series:

x86-64 Introduction to SASM: Memory

Sensei RL Uy, College of Computer Studies,
De La Salle University, Manila, Philippines

Copyright Notice

SASM using memory I/O macro (**output**)

PRINT_DEC (decimal output)

Syntax: PRINT_DEC size, data

size: size of **data** in bytes
data: number or symbol constant, name of variable, register or address

Note:
- Print number **data** **in *signed*** decimal representation

Example:
PRINT_DEC 4, var1

SASM using memory I/O macro (output)

PRINT_UDEC (decimal output)

Syntax: PRINT_UDEC size, data

size: **size** of **data** in bytes
data: number or symbol constant, name of variable, register or address

Note:
- Print number **data** **in *unsigned*** decimal representation

Example:
PRINT_UDEC 4, var1

SASM using memory I/O macro (output)

PRINT_HEX
(hexadecimal output)

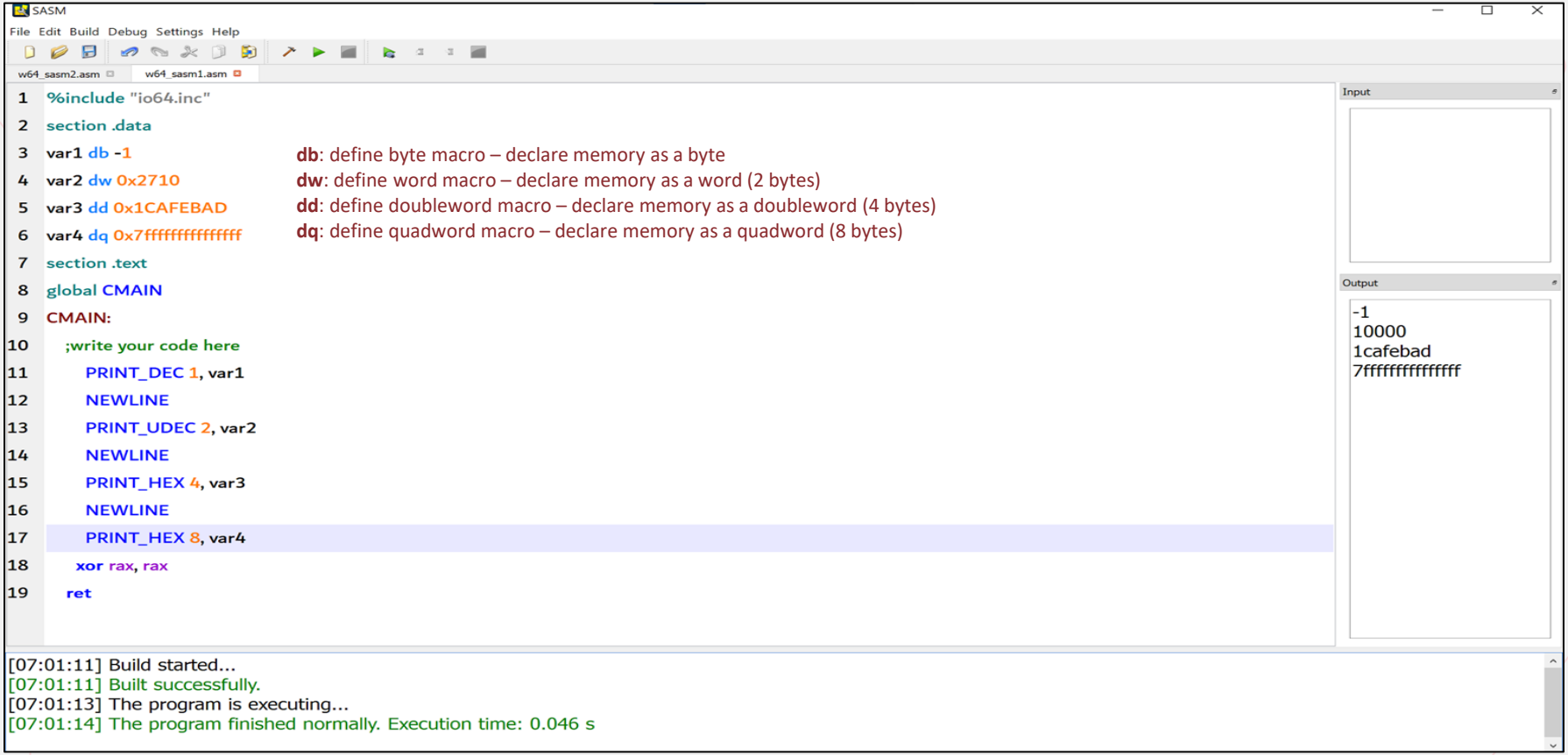
Syntax: PRINT_HEX size, data

size: size of **data** in bytes
data: number or symbol constant, name of variable, register or address

Note:

- Print number **data** in hexadecimal representation

Example:
PRINT_HEX 4, var1


SASM
File Edit Build Debug Settings Help
w64_sasm2.asm
w64_sasm1.asm
1 %include "io64.inc"
2 section .data
3 var1 db -1
4 var2 dw 0x2710
5 var3 dd 0x1CAFEBAD
6 var4 dq 0x7fffffffffffffff
7 section .text
8 global CMAIN
9 CMAIN:
10 ;write your code here
11 PRINT_DEC 1, var1
12 NEWLINE
13 PRINT_UDEC 2, var2
14 NEWLINE
15 PRINT_HEX 4, var3
16 NEWLINE
17 PRINT_HEX 8, var4
18 xor rax, rax
19 ret
db: define byte macro – declare memory as a byte
dw: define word macro – declare memory as a word (2 bytes)
dd: define doubleword macro – declare memory as a doubleword (4 bytes)
dq: define quadword macro – declare memory as a quadword (8 bytes)
Input
Output
-1
10000
1cafebad
7fffffffffffffff
[07:01:11] Build started...
[07:01:11] Built successfully.
[07:01:13] The program is executing...
[07:01:14] The program finished normally. Execution time: 0.046 s

SASM using memory I/O macro (input)

GET_DEC (decimal input)

Syntax: GET_DEC size, data

size: size of data in bytes
data: number or symbol constant, name of variable, register or address

Note:

- Input number **data** **in *signed*** decimal representation from stdin (command line interface) or input window (SASM)

Example:

GET_DEC 4, var1

SASM using memory I/O macro (input)

GET_UDEC (decimal input)

Syntax: GET_UDEC size, data

size: size of **data** in bytes
data: number or symbol constant, name of variable, register or address

Note:

- Input number **data** **in *unsigned*** decimal representation from stdin (command line interface) or input window (SASM)

Example:
GET_UDEC 4, var1

SASM using register I/O macro (input)

GET_HEX (hexadecimal input)

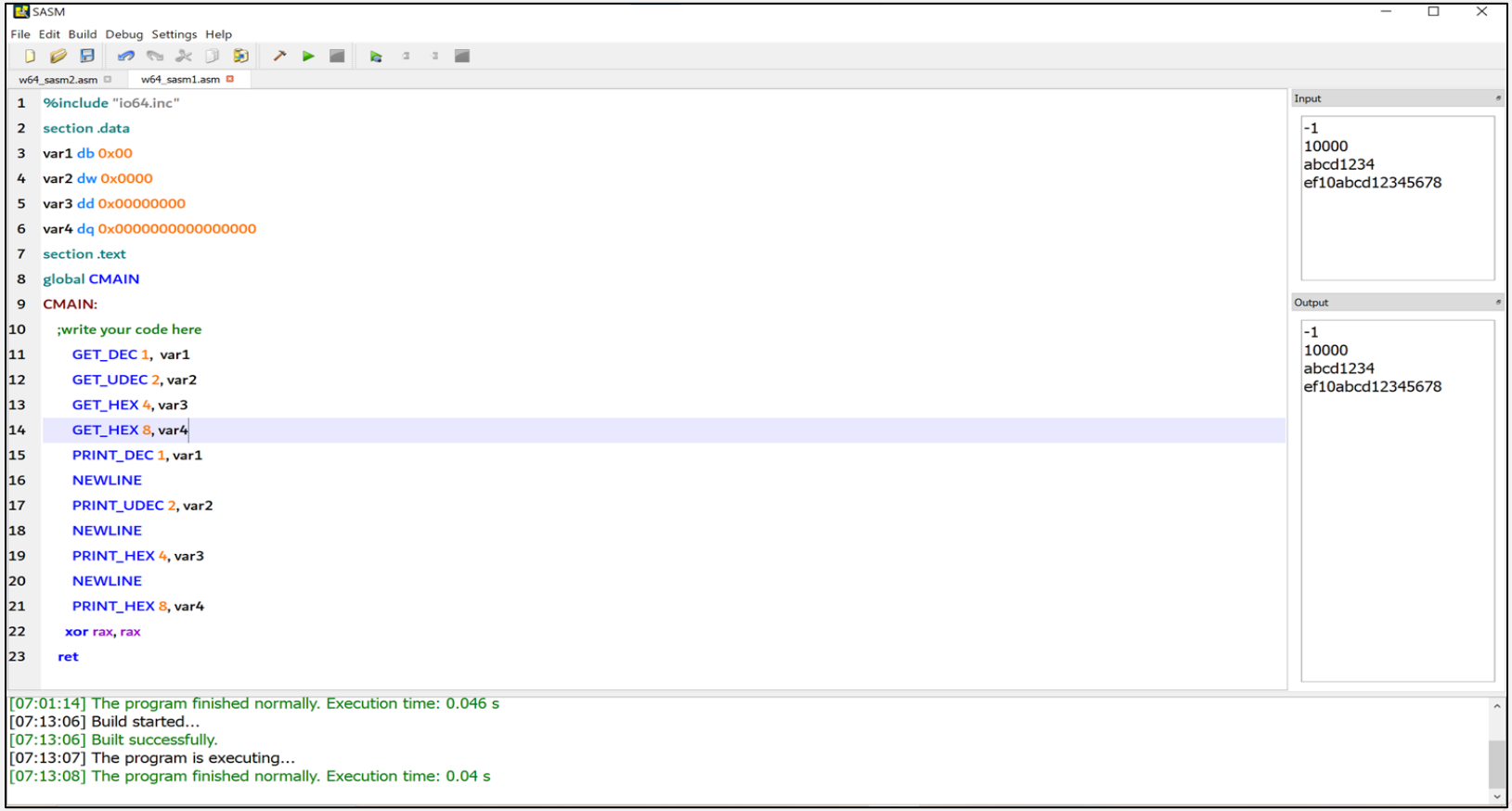
Syntax: GET_HEX size, data

size: size of **data** in bytes
data: number or symbol constant, name of variable, register or address

Note:

- Input number **data** in hexadecimal representation **(with 0x)** from stdin (command line interface) or input window (SASM)

Example:
GET_UDEC 4, var1


SASM
File Edit Build Debug Settings Help
w64_sasm2.asm
w64_sasm1.asm
%include "io64.inc"
section .data
var1 db 0x00
var2 dw 0x0000
var3 dd 0x00000000
var4 dq 0x0000000000000000
section .text
global CMAIN
CMAIN:
;write your code here
GET_DEC 1, var1
GET_UDEC 2, var2
GET_HEX 4, var3
GET_HEX 8, var4
PRINT_DEC 1, var1
NEWLINE
PRINT_UDEC 2, var2
NEWLINE
PRINT_HEX 4, var3
NEWLINE
PRINT_HEX 8, var4
xor rax, rax
ret
Input
-1
10000
abcd1234
ef10abcd12345678
Output
-1
10000
abcd1234
ef10abcd12345678
[07:01:14] The program finished normally. Execution time: 0.046 s
[07:13:06] Build started...
[07:13:06] Built successfully.
[07:13:07] The program is executing...
[07:13:08] The program finished normally. Execution time: 0.04 s

SASM using register I/O macro (input)

GET_CHAR (character input)

Syntax: GET_CHAR data

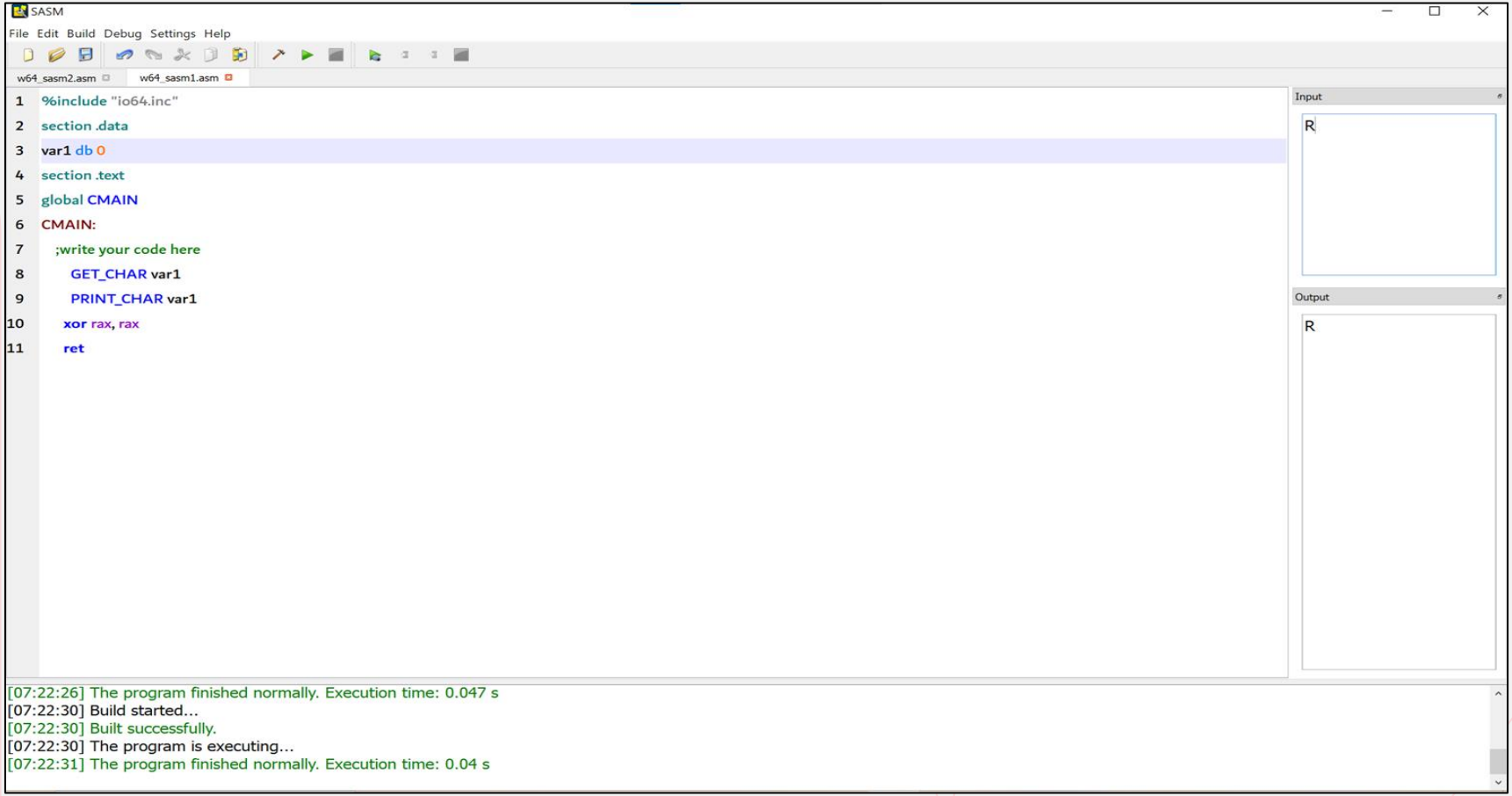
data: name of variable, or address

Note:

- Input **1 character** and store to **data**

Example:

GET_CHAR var1


SASM
File Edit Build Debug Settings Help
w64_sasm2.asm
w64_sasm1.asm
1 %include "io64.inc"
2 section .data
3 var1 db 0
4 section .text
5 global CMAIN
6 CMAIN:
7 ;write your code here
8 GET_CHAR var1
9 PRINT_CHAR var1
10 xor rax, rax
11 ret
Input
R
Output
R
[07:22:26] The program finished normally. Execution time: 0.047 s
[07:22:30] Build started...
[07:22:30] Built successfully.
[07:22:30] The program is executing...
[07:22:31] The program finished normally. Execution time: 0.04 s

SASM using register I/O macro (input)

GET_STRING (string input)

Syntax:
GET_STRING data, maxsz

data: name of variable, or address
maxsz: register or number constant

Note:

- *maxsz* – support up to *maxsz*-1 characters. The remaining character is to store the null character (0x00) (SASM version).
- *maxsz* – support up to *maxsz*-2 characters. The remaining 2 characters are “line feed (0x0A)” and null character (0x00) (CLI/DOS version).

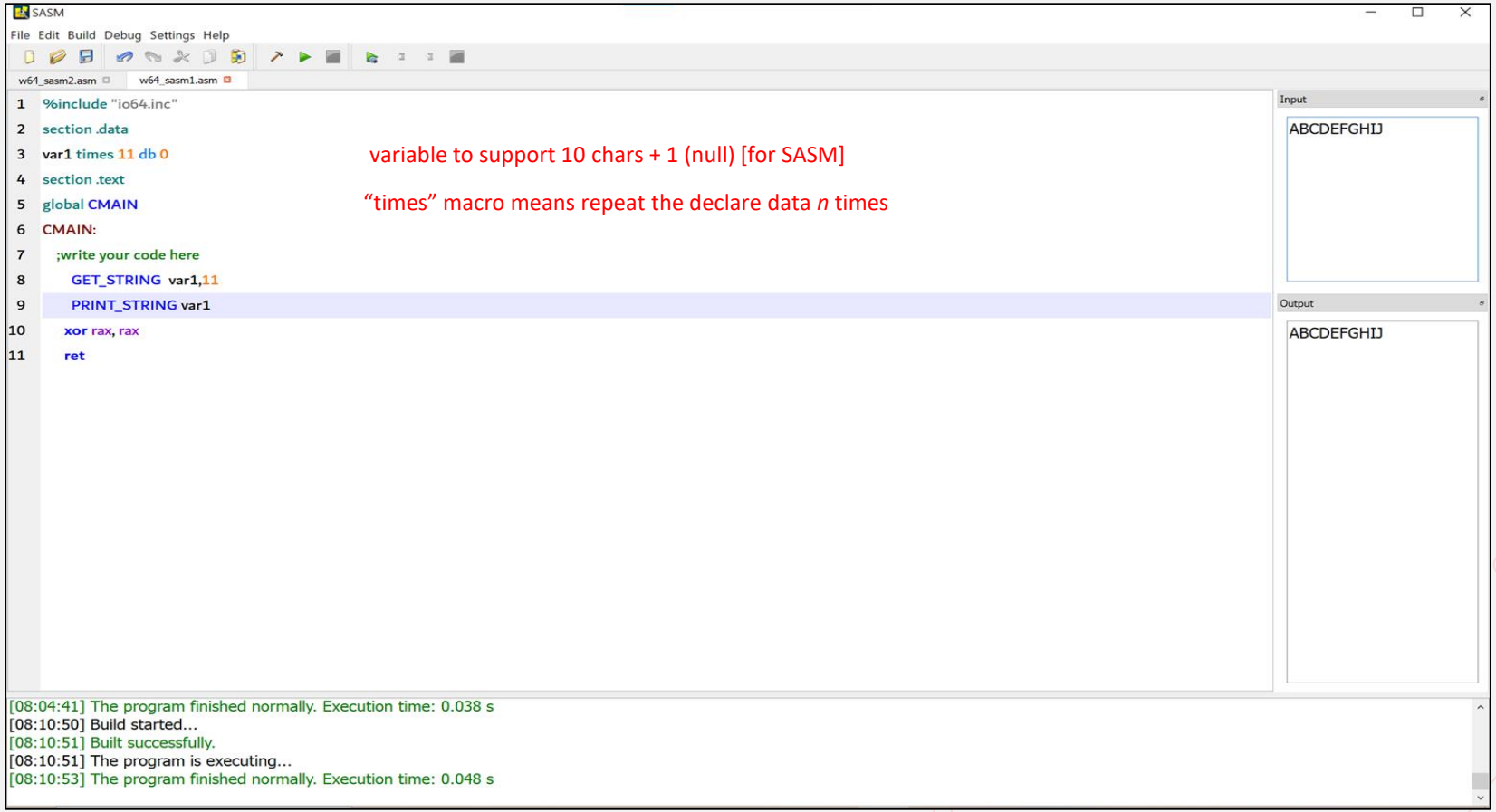
SASM using register I/O macro (input)

GET_STRING (string input)

Syntax:
GET_STRING data, maxsz

data: name of variable, or address
maxsz: register or number constant

Example:
GET_STRING var1, 11


SASM
File Edit Build Debug Settings Help
w64_sasm2.asm
w64_sasm1.asm
1 %include "io64.inc"
2 section .data
3 var1 times 11 db 0
4 section .text
5 global CMAIN
6 CMAIN:
7 ;write your code here
8 GET_STRING var1,11
9 PRINT_STRING var1
10 xor rax, rax
11 ret
variable to support 10 chars + 1 (null) [for SASM]
“times” macro means repeat the declare data n times
Input
ABCDEFGHIJ
Output
ABCDEFGHIJ
[08:04:41] The program finished normally. Execution time: 0.038 s
[08:10:50] Build started...
[08:10:51] Built successfully.
[08:10:51] The program is executing...
[08:10:53] The program finished normally. Execution time: 0.048 s