

# Computer Architecture Lab

Lab10 – Week #10

# JAVA Runtime Environment (1/4)

➤ <https://www.java.com/ko/>

Java™ 다운로드 Developer Resources 도움말

macOS의 일부 Java 8 사용자에게 필요한 수동 업데이트

**Click!** 데스크톱 애플리케이션용 Java 얻기

Java 다운로드

Java란? | 설치 해제 도움말

JDK 다운로드를 찾는 소프트웨어 개발자입니까?

OpenJDK 초기 액세스 구축 Java SE Development Kit

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# JAVA Runtime Environment (2/4)



다운로드 Developer Resources 도움말

검색

## 도움말 리소스

[Java란 무엇입니까?](#)

[이전 버전 제거](#)

[Java 사용 안함](#)

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## Windows용 64비트 Java

**Version 8 Update 371** (파일 크기: **62.62 MB**) **Java 8**이 권장되는 이유?

릴리스 날짜: 2023년 4월 18일

### Oracle Java 중요 라이선스 정보

**Oracle Java** 라이선스는 2019년 4월 16일 릴리스부터 변경되었습니다.

Oracle Java SE에 대한 Oracle Technology Network 라이선스 합의서는 이전 Oracle Java 라이선스와는 상당히 다릅니다. 이 라이선스는 개인 용도 및 개발 용도와 같은 특정 목적의 무료 사용은 허용하지만, 이전 Oracle Java 라이선스에서 권한이 부여된 기타 사용은 더 이상 허용되지 않습니다. 이 제품을 다운로드하여 사용하기 전에 약관을 자세히 검토하십시오. FAQ는 [여기서](#) 확인할 수 있습니다.

상용 라이선스 및 지원은 저렴한 비용의 [Java SE 구독](#)을 통해 제공됩니다.

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Java 다운로드

Java를 다운로드하면 귀하가 Oracle Java SE에 대한 Oracle Technology Network 라이선스 합의서를 읽고 이 조항에 동의하는 것으로 간주됩니다.

Java 설치가 완료되면 브라우저를 재시작해야 할 수 있습니다(모든 브라우저 창을 닫았다가 다시 열기).

» [Windows용 64비트 Java에 대한 FAQ](#)

» [시스템 요구사항](#)

사용 중인 운영체제와 다릅니까? 데스크톱 사용자를 위한 모든 Java 8 다운로드를 확인하십시오.

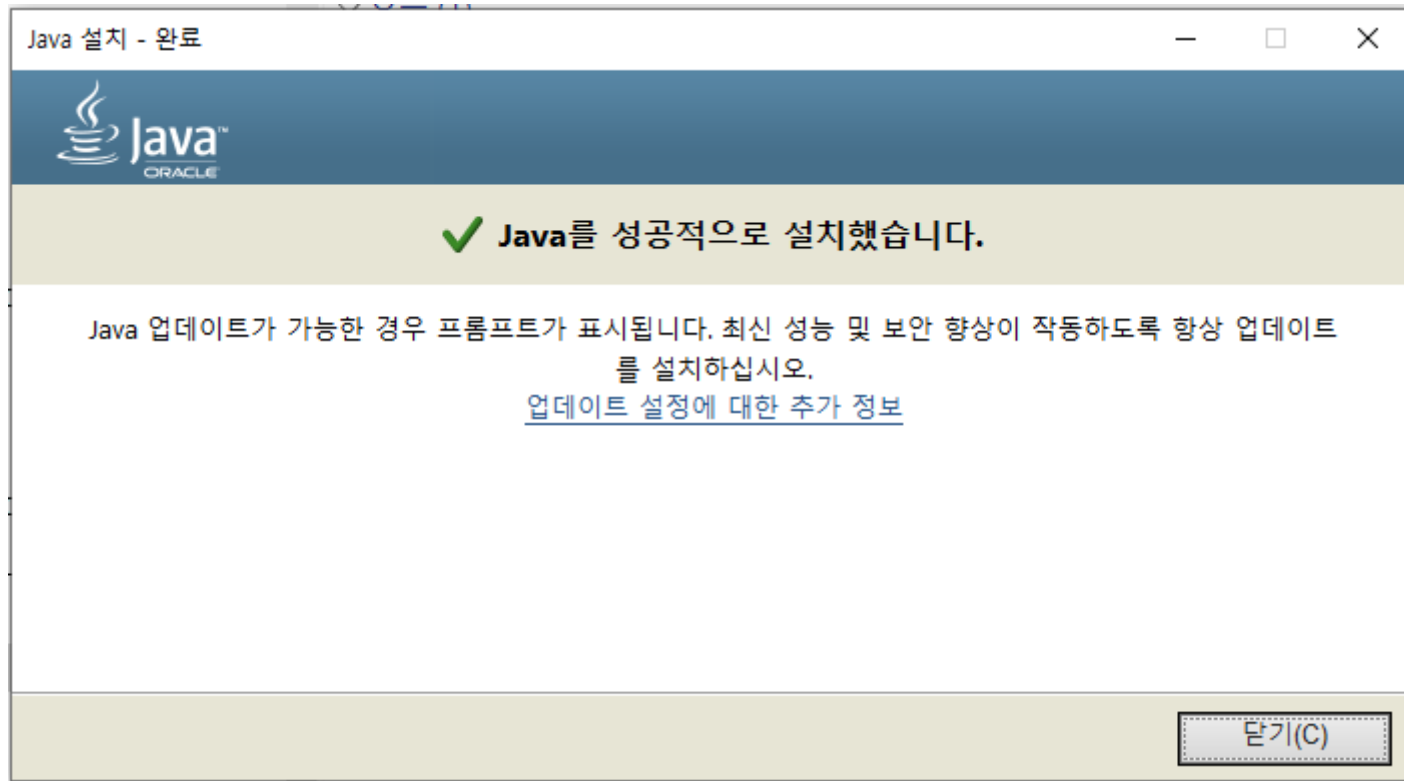
# JAVA Runtime Environment (3/4)



jre-8u371-window....exe




# JAVA Runtime Environment (4/4)



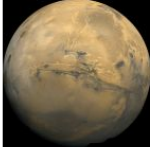
# Mars (1/12)

➤ <http://courses.missouristate.edu/kenvollmar/mars/>


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Feb. 2013: "MARS has been tested in the Softpedia labs using several industry-leading security solutions and found to be completely clean of adware/spyware components. ... Softpedia guarantees that MARS 4.3 is 100% FREE, which means it does not contain any form of malware, including spyware, viruses, trojans and backdoors."

[Download MARS from Softpedia](#) (version on Softpedia may lag behind the version on this page).

**[Download MARS 4.5 software!](#)** (Aug. 2014)

**Note:** [Is your MARS text unreadably small?](#) Download and use a new release [Java 9](#), which contains a fix to automatically scale and size AWT and Swing components for High Dots Per Inch (HiDPI) displays on Windows and Linux. [Technical details](#).

**New for 4.0:** new editor, featuring multiple files, context-sensitive input, and color-coding.


- See a [screenshot](#) (1478 x 889 pixels, 198 KB JPEG)
- [Tutorial materials](#)
- Sample MIPS assembly program to run under MARS [Fibonacci.asm](#)

[MARS features overview](#); ([List of features by version](#))

- GUI with point-and-click control and integrated editor
- Easily editable register and memory values, similar to a spreadsheet
- Display values in hexadecimal or decimal
- Command line mode for instructors to test and evaluate many programs easily
- Floating point registers, coprocessor1 and coprocessor2. Standard tool: bit-level view and edit of 32-bit floating point registers ([screenshot](#)).
- Variable-speed single-step execution

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Maintained by: Ken Vollmar, last updated: August 16, 2015. URL: <http://courses.missouristate.edu/kenvollmar/mars/>

- Single-step backwards

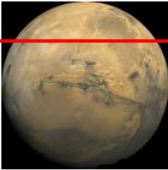


# Mars (2/12)

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abcdefghijklmnopqrstuvwxyz



[Download MARS](#) **V4.5, Aug. 2014** (jar archive including Java source code)

**Note: Is your MARS text unreadably small?** Download and use a new release [Java 9](#), which contains a fix to automatically scale and size AWT and Swing components for High Dots Per Inch (HiDPI) displays on Windows and Linux. [Technical details](#)

Previous MARS version: [MARS v4.4, Aug. 2013](#)

100% FREE

NO SPYWARE  
NO ADWARE  
NO VIRUSES

SOFTPEDIA™

certified by www.softpedia.com

Feb. 2013: "MARS has been tested in the Softpedia labs using several industry-leading security solutions and found to be completely clean of adware/spyware components. ... Softpedia guarantees that MARS 4.3 is 100% FREE, which means it does not contain any form of malware, including spyware, viruses, trojans and backdoors."

[Download MARS from Softpedia](#) (version on Softpedia may lag behind the version on this page).

**Option A: Desktop.** Save the jar file on the desktop. Run MARS by double-clicking the icon.

**Option B: DOS shell using jar file.** Save the jar file in some folder. Open a DOS shell in that folder. Rename the jar file to "Mars.jar" for convenience. Run MARS with the DOS command `java -jar Mars.jar`

**Option C: DOS shell using Java classes.** Save the jar file in some folder. Open a DOS shell in that folder. Rename the jar file to "Mars.jar" for convenience. Extract MARS files with the DOS command `jar -xf Mars.jar` Run MARS with the DOS command `java Mars`

**As of V4.0, MARS requires Java J2SE 1.5 (or later) SDK installed on your computer.**

[Download Java](#)

Sample MIPS assembly program to run under MARS [Fibonacci.asm](#)

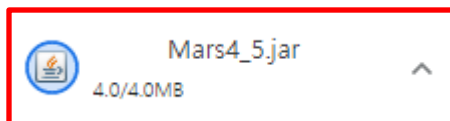
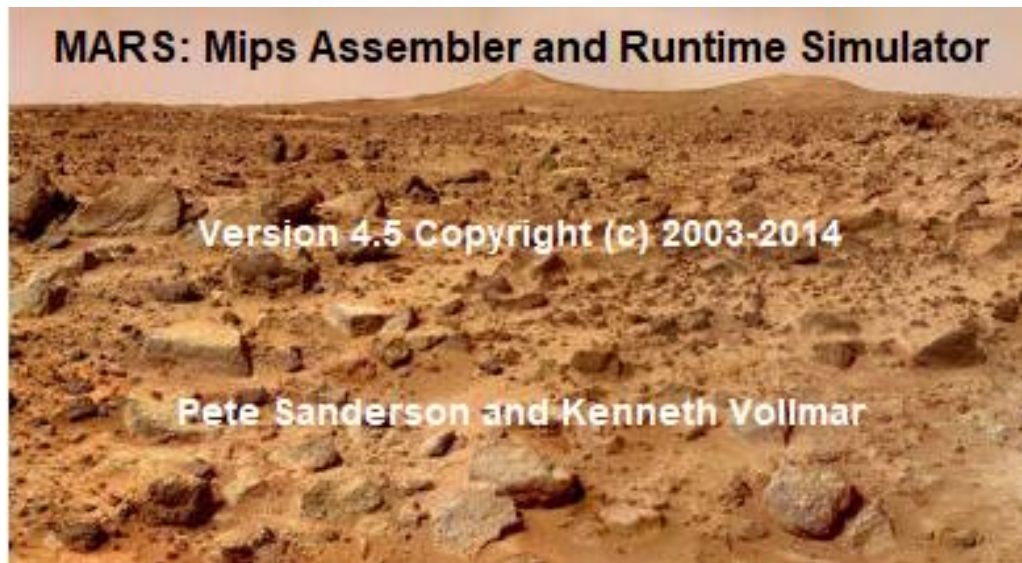
A "tool" is the MARS utility for MIPS control of simulated devices, including contention for resources. Sample tool is a Scavenger Hunt ([screenshot 23KB](#)), in which each student writes a MIPS subroutine to direct the path of a character to travel to several locations. The companion Java "tool" program graphically displays the position of each character as the Scavenger Hunt game progresses. Interested instructors please contact [Ken Vollmar](#) for MIPS assembly solution or further information.

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Maintained by: [Ken Vollmar](#) • Last Modified: December 8, 2017 • URL: <http://courses.missouristate.edu/kenvollmar/mars/download.htm>

# Mars (3/12)

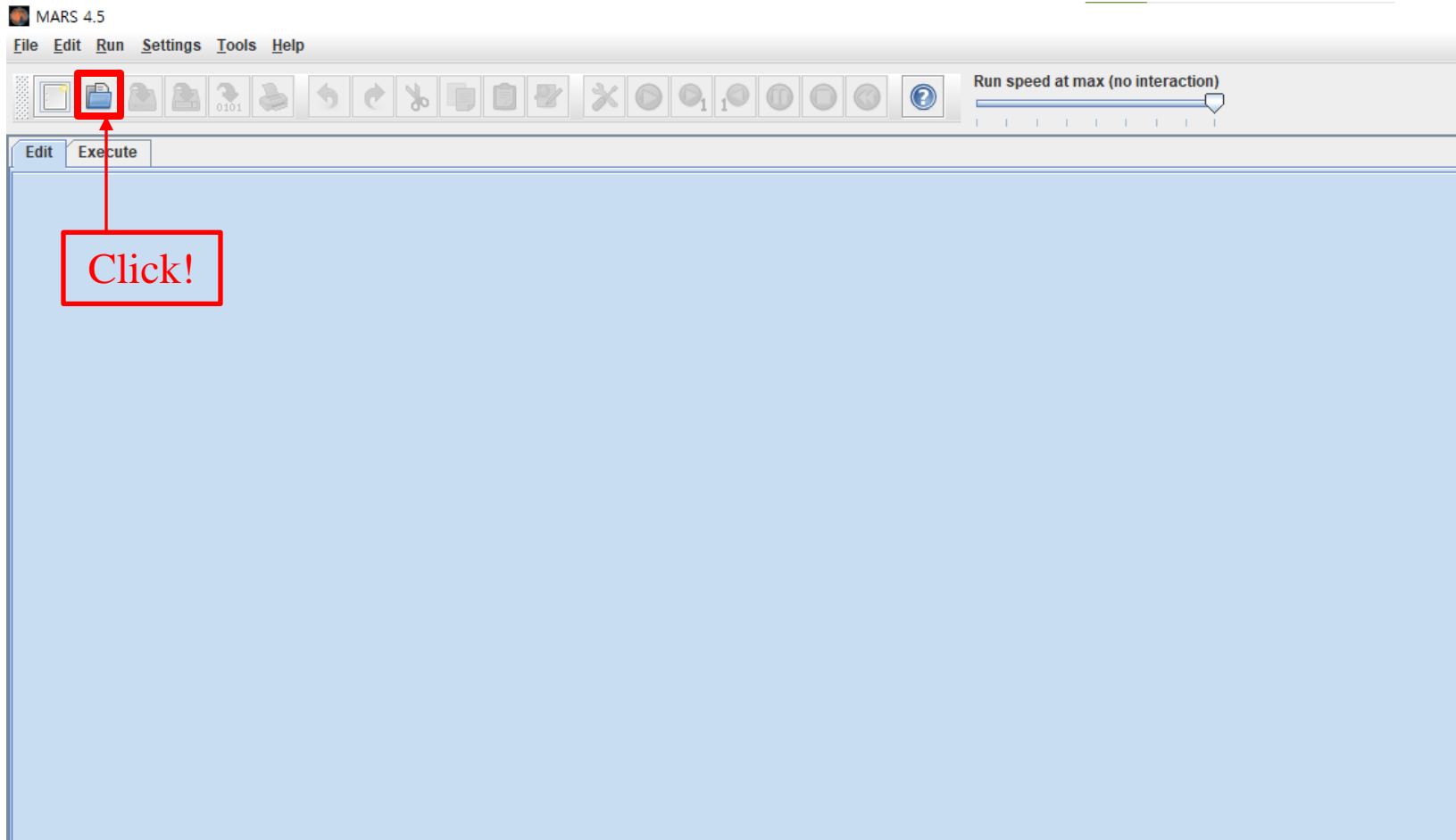
---

 Mars4\_5.jar

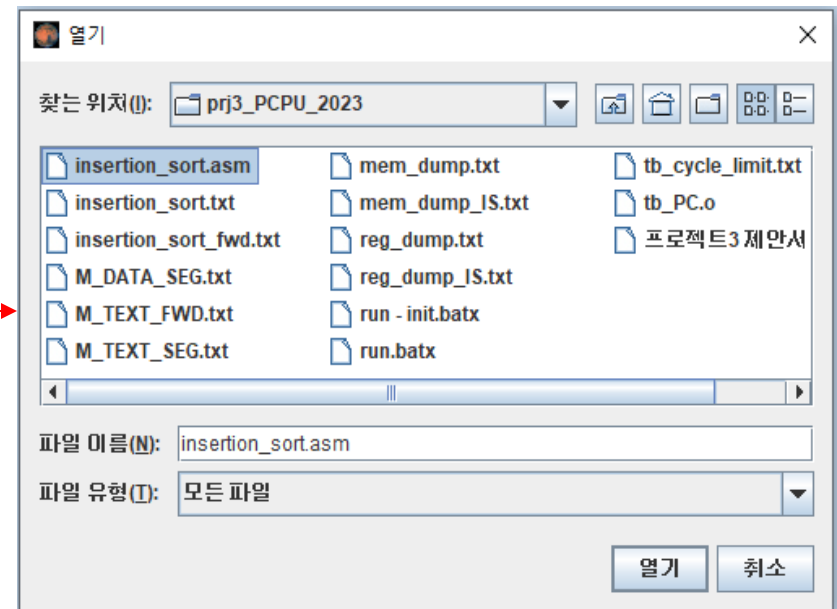
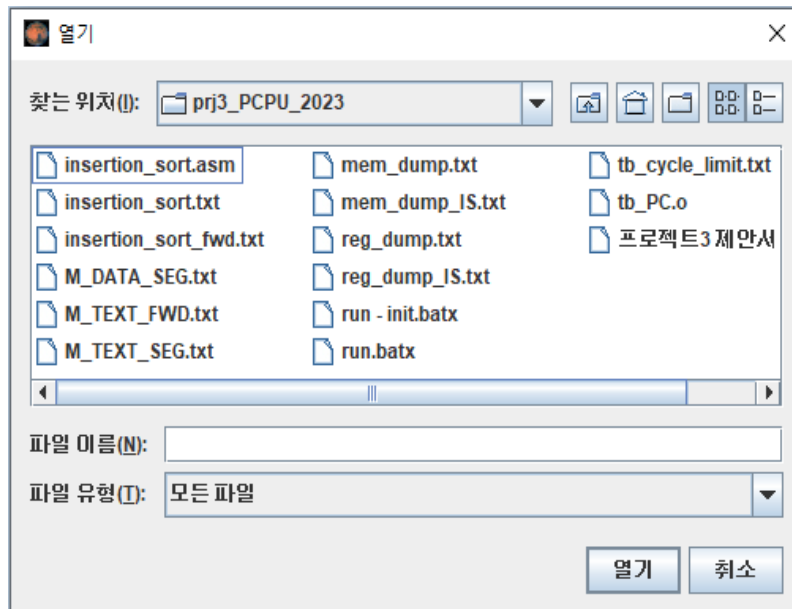




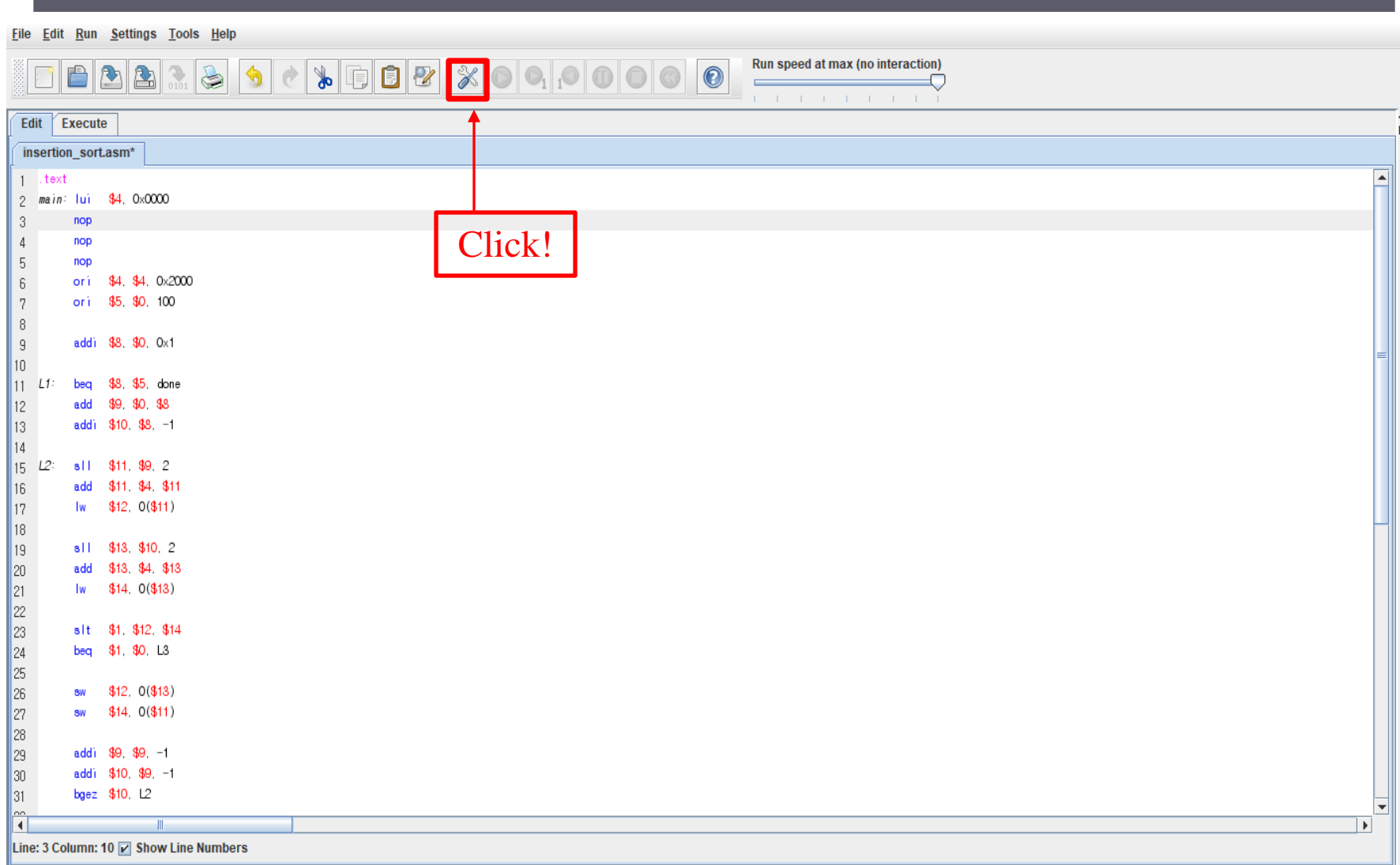
# Mars (4/12)



# Mars (5/12)



# Mars (6/12)



# Mars (7/12)

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Click!

**Text Segment**

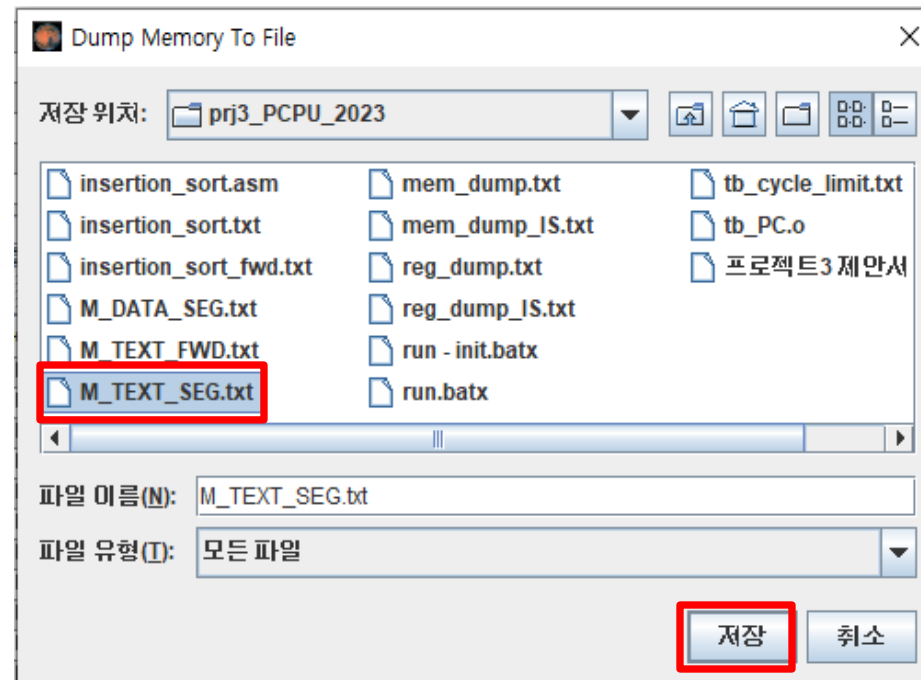
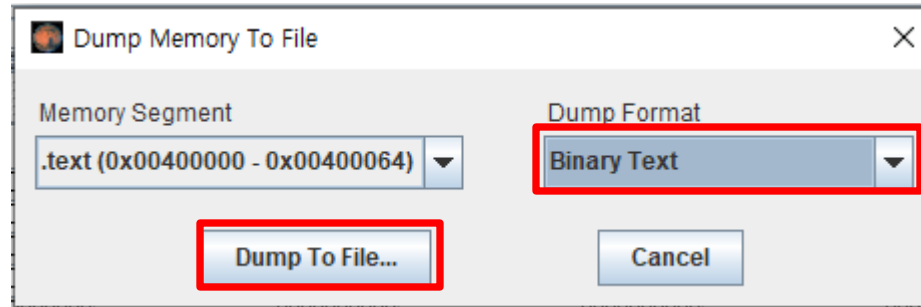
Bkpt	Address	Code	Source
	0x00400000	0x3c040000 lui \$4,0x00000000	2: main: lui \$4, 0x0000
	0x00400004	0x00000000 nop	3: nop
	0x00400008	0x00000000 nop	4: nop
	0x0040000c	0x00000000 nop	5: nop
	0x00400010	0x34842000 ori \$4,\$4,0x00002000	6: ori \$4, \$4, 0x2000
	0x00400014	0x34050064 ori \$5,\$0,0x00000064	7: ori \$5, \$0, 100
	0x00400018	0x20080001 addi \$8,\$0,0x00000001	9: addi \$8, \$0, 0x1
	0x0040001c	0x11050011 beq \$8,\$5,0x00000011	11: L1: beq \$8, \$5, done
	0x00400020	0x00084820 add \$9,\$0,\$8	12: add \$9, \$0, \$8
	0x00400024	0x210affff addi \$10,\$8,0xfffffff	13: addi \$10, \$8, -1
	0x00400028	0x00095880 sll \$11,\$9,0x00000002	15: L2: sll \$11, \$9, 2
	0x0040002c	0x000b5820 add \$11,\$4,\$11	16: add \$11, \$4, \$11
	0x00400030	0x8d5c0000 lw \$12,0x00000000(\$11)	17: lw \$12, 0(\$11)
	0x00400034	0x000a6880 sll \$13,\$10,0x00000002	19: sll \$13, \$10, 2
	0x00400038	0x0008d820 add \$13,\$4,\$13	20: add \$13, \$4, \$13
	0x0040003c	0x8dae0000 lw \$14,0x00000000(\$13)	21: lw \$14, 0(\$13)

**Data Segment**

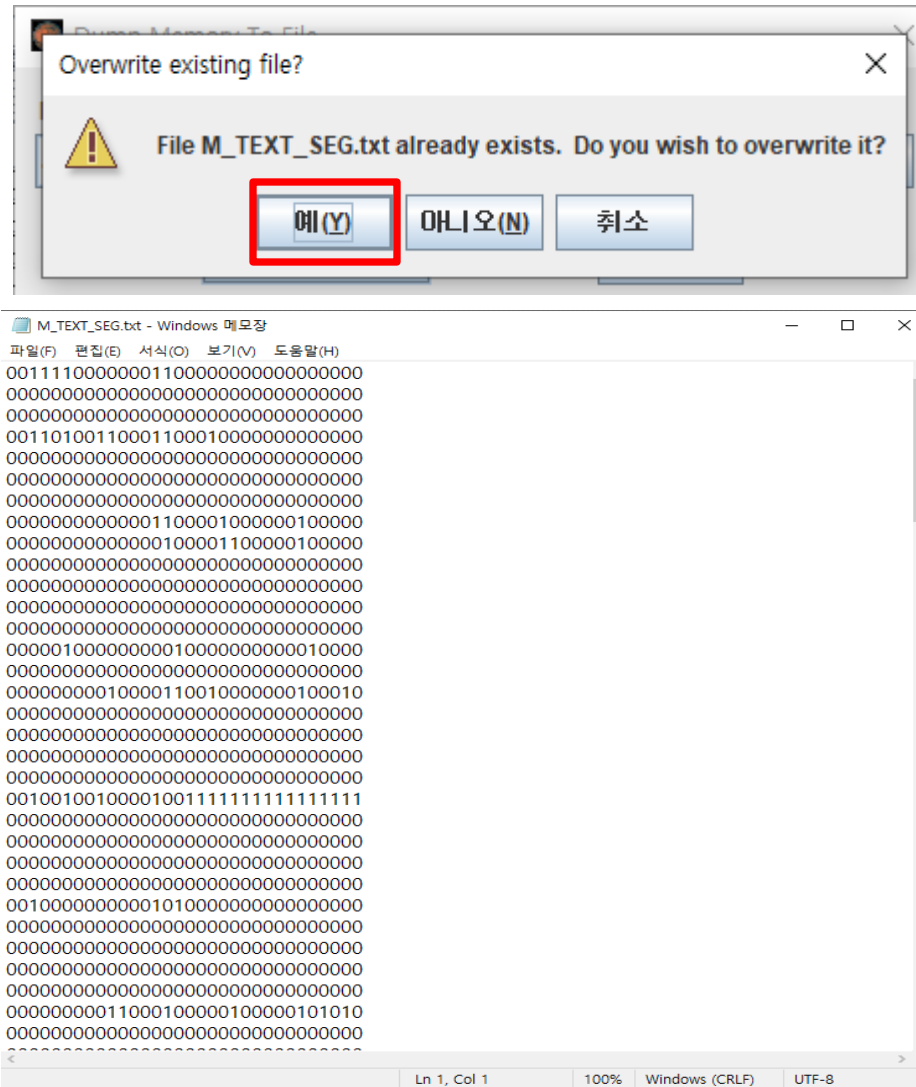
Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x10010000	0x00007934	0x000040e2	0x00003289	0x00001d65	0x000061ad	0x00004624	0x00005d9c	0x0000367f
0x10010020	0x00000c0c	0x00005c90	0x0000f29	0x00002e60	0x00006147	0x000041cb	0x00006565	0x000061fe
0x10010040	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010060	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010080	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100100a0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100100c0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100100e0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010100	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010120	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010140	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010160	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x10010180	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000
0x100101a0	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000	0x00000000

0x10010000 (.data) Hexadecimal Addresses Hexadecimal Values ASCII

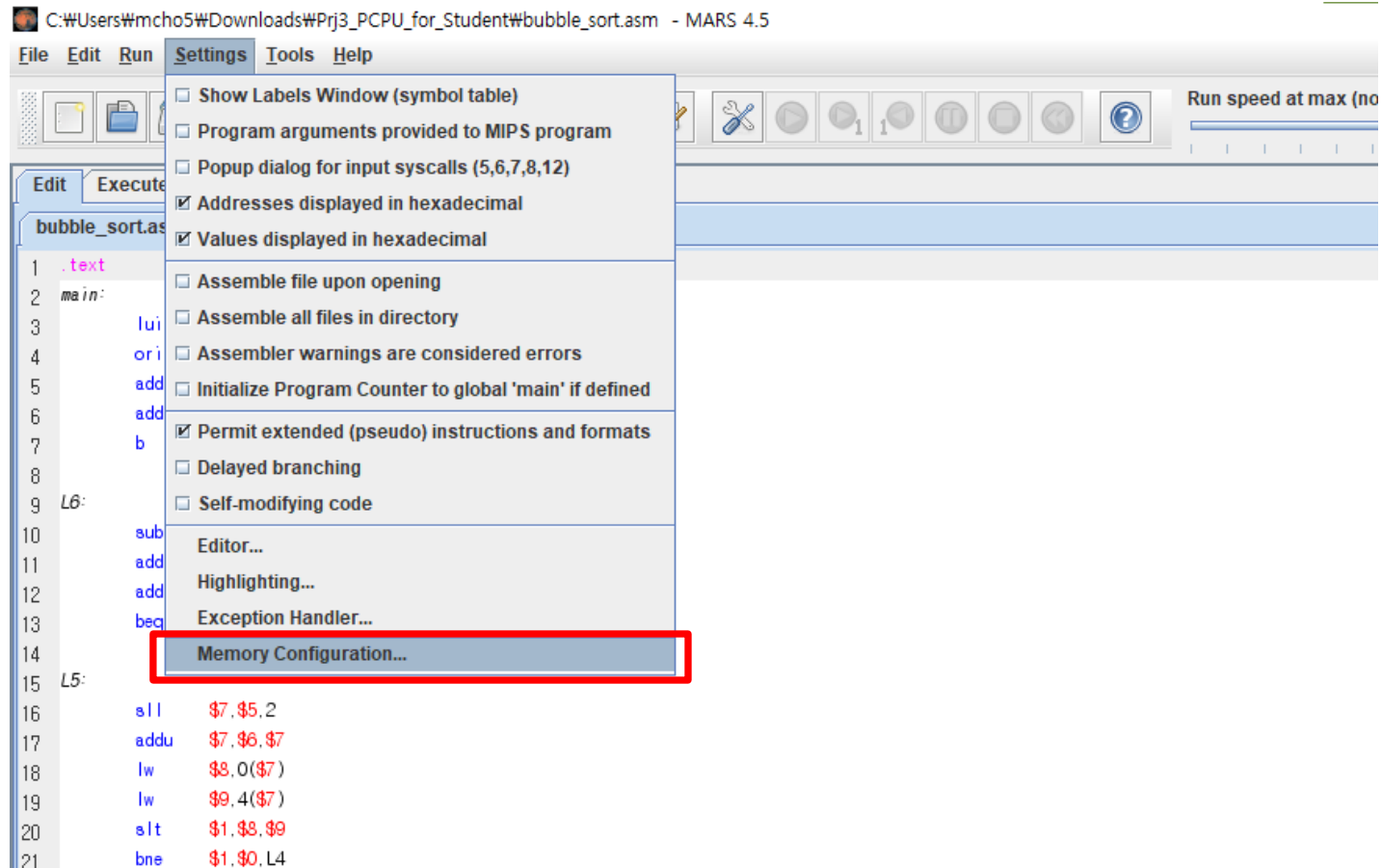
# Mars (8/12)



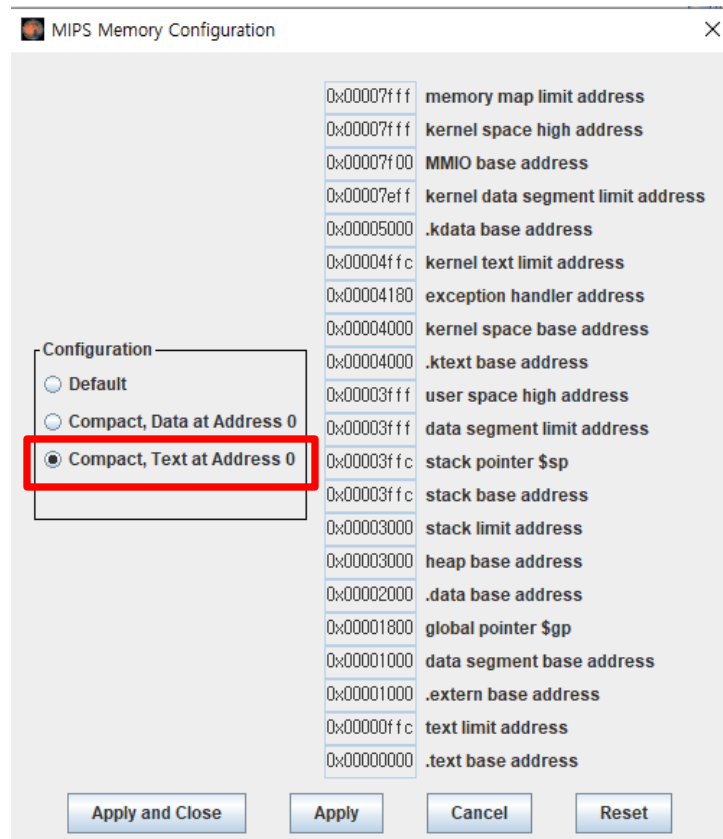
# Mars (9/12)



# Mars (10/12)



# Mars (11/12)





# Mars (12/12)

File Edit Run Settings Tools Help

Run speed at max (no interaction)

Edit Execute

**Text Segment**

Bkpt	Address	Code	Basic	Source
	0x00000000	0x3c040000 lui	\$4, 0x00000000	2: main: lui \$4, 0x0000
	0x00000004	0x00000000 nop		3: nop
	0x00000008	0x00000000 nop		4: nop
	0x0000000c	0x00000000 nop		5: nop
	0x00000010	0x34042000 ori	\$4, \$4, 0x0002000	6: ori \$4, \$4, 0x2000
	0x00000014	0x34050064 ori	\$5, \$0, 0x00000064	7: ori \$5, \$0, 100
	0x00000018	0x20080001 add	\$8, \$0, 0x00000001	9: add \$8, \$0, 0x1
	0x0000001c	0x11050011 beq	\$8, \$5, 0x00000011	11: L1: beq \$8, \$5, done
	0x00000020	0x00048200 add	\$9, \$0, \$8	12: add \$9, \$0, \$8
	0x00000024	0x210affff add	\$10, \$8, 0xffffffff	13: add \$10, \$8, -1
	0x00000028	0x00095880 sll	\$11, \$9, 0x00000002	15: L2: sll \$11, \$9, 2
	0x0000002c	0x00065820 add	\$11, \$4, \$11	16: add \$11, \$4, \$11
	0x00000030	0x806c0000 lw	\$12, 0x00000000(\$11)	17: lw \$12, 0(\$11)
	0x00000034	0x00065880 sll	\$13, \$10, 0x00000002	19: sll \$13, \$10, 2
	0x00000038	0x00065820 add	\$13, \$4, \$13	20: add \$13, \$4, \$13
	0x0000003c	0x806e0000 lw	\$14, 0x00000000(\$13)	21: lw \$14, 0(\$13)

**Data Segment**

Address	Value (+0)	Value (+4)	Value (+8)	Value (+c)	Value (+10)	Value (+14)	Value (+18)	Value (+1c)
0x00002000	0x0007934	0x00040e2	0x0003289	0x0001d65	0x00061ad	0x00004624	0x0005d3c	0x0003b7f
0x00002020	0x0000c0c	0x0005c90	0x0000f29	0x0002c60	0x0006147	0x000041cb	0x0006565	0x000061fe
0x00002040	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x00002060	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x00002080	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x000020a0	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x000020c0	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x000020e0	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x00002100	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x00002120	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x00002140	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x00002160	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x00002180	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000
0x000021a0	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000	0x0000000

0x00002000 (.data) ☒ Hexadecimal Addresses ☒ Hexadecimal Values ☐ ASCII

**Mars Messages** Run I/O

Assembly: assembling C:\Users\mp154\OneDrive\바탕 화면\prj3\_PCPU\_2023\insertion\_sort.asm

Assembly: operation completed successfully.

Clear

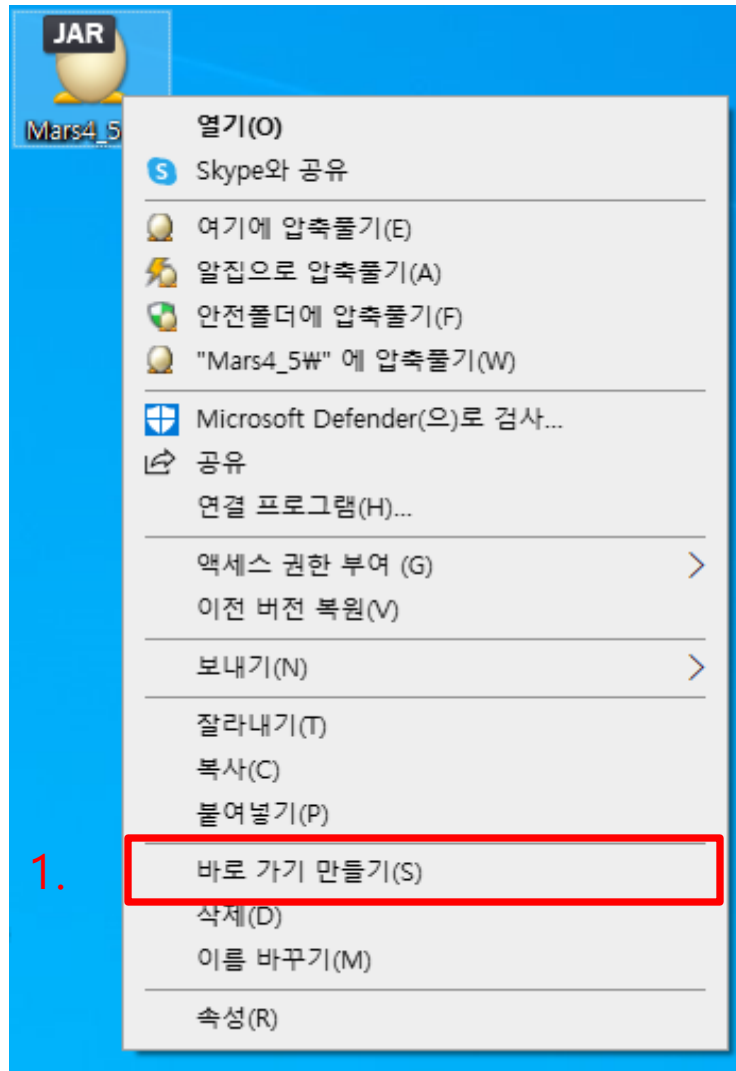
Assembly: assembling C:\Users\mp154\OneDrive\바탕 화면\prj3\_PCPU\_2023\insertion\_sort.asm

Assembly: operation completed successfully.

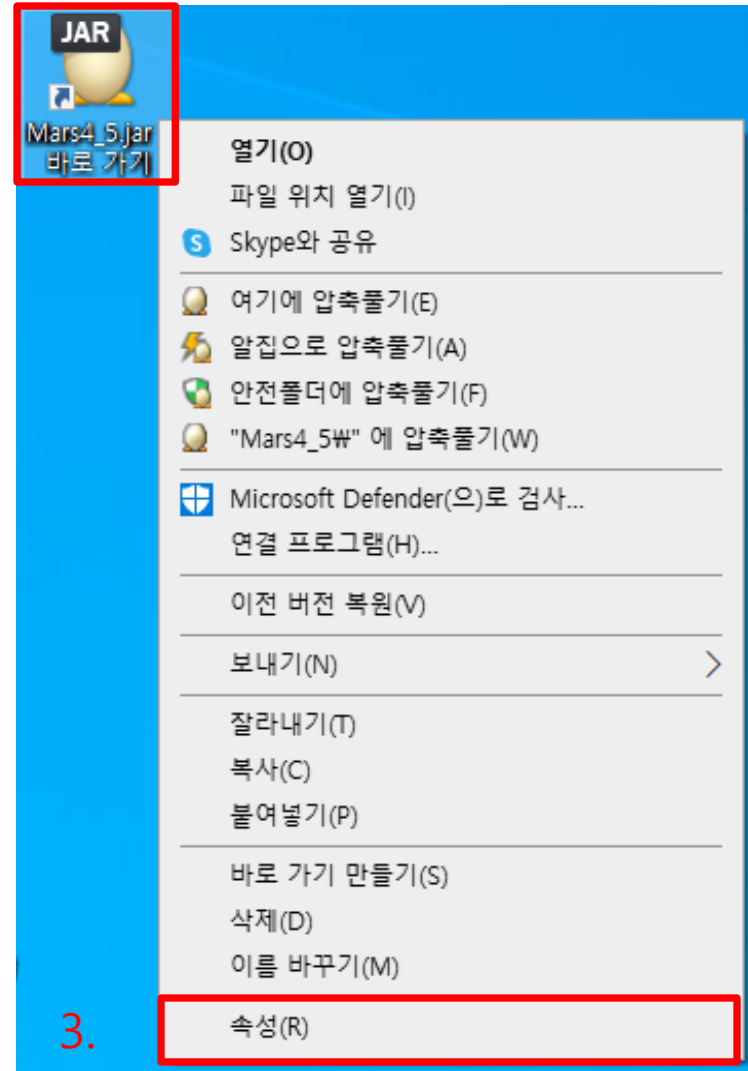
**Registers** Coproc 1 Coproc 0

Name	Number	Value
\$8 (vaddr)	8	0x00000000
\$12 (status)	12	0x0000f111
\$13 (cause)	13	0x00000000
\$14 (epc)	14	0x00000000

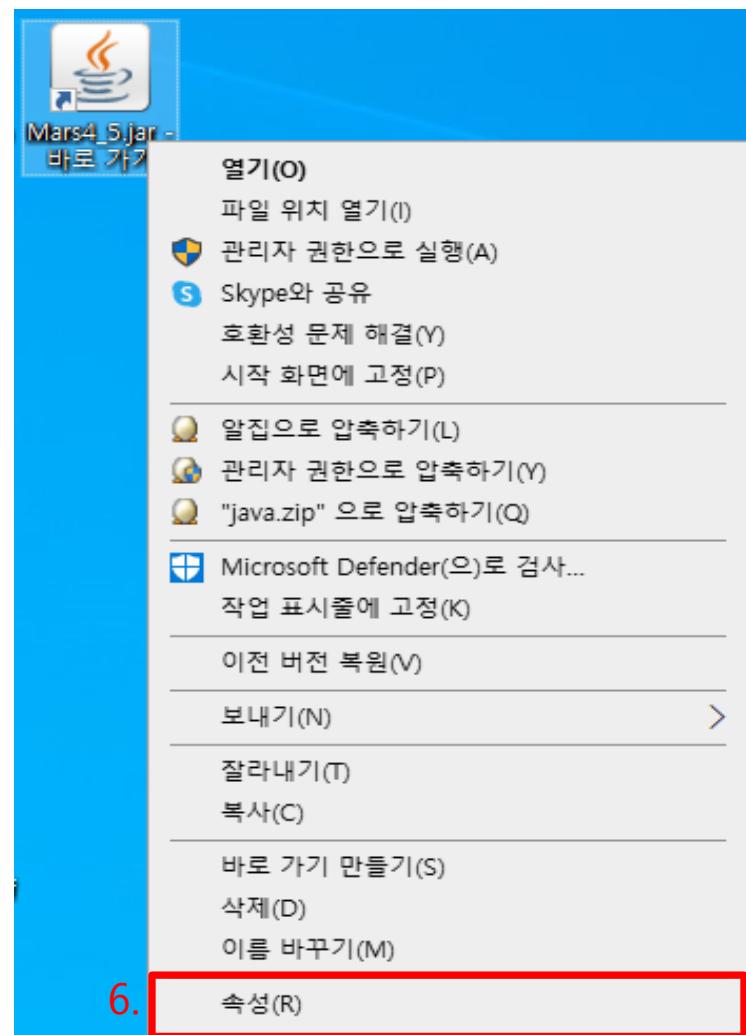
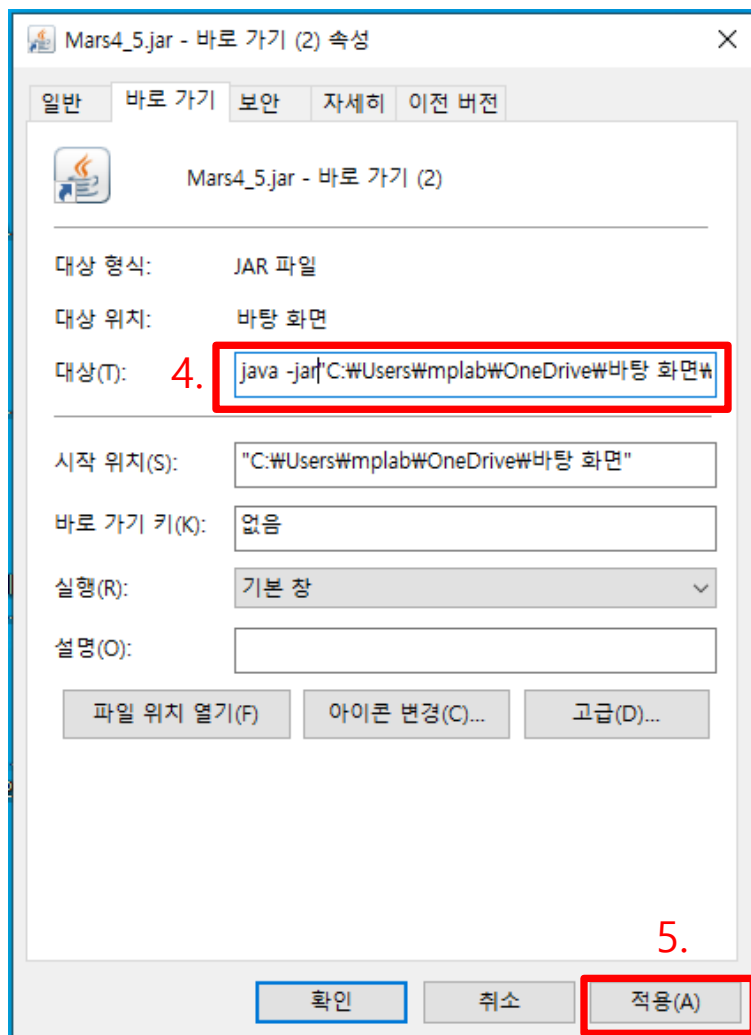
# Mars 바로가기 만드는 법 (1/3)



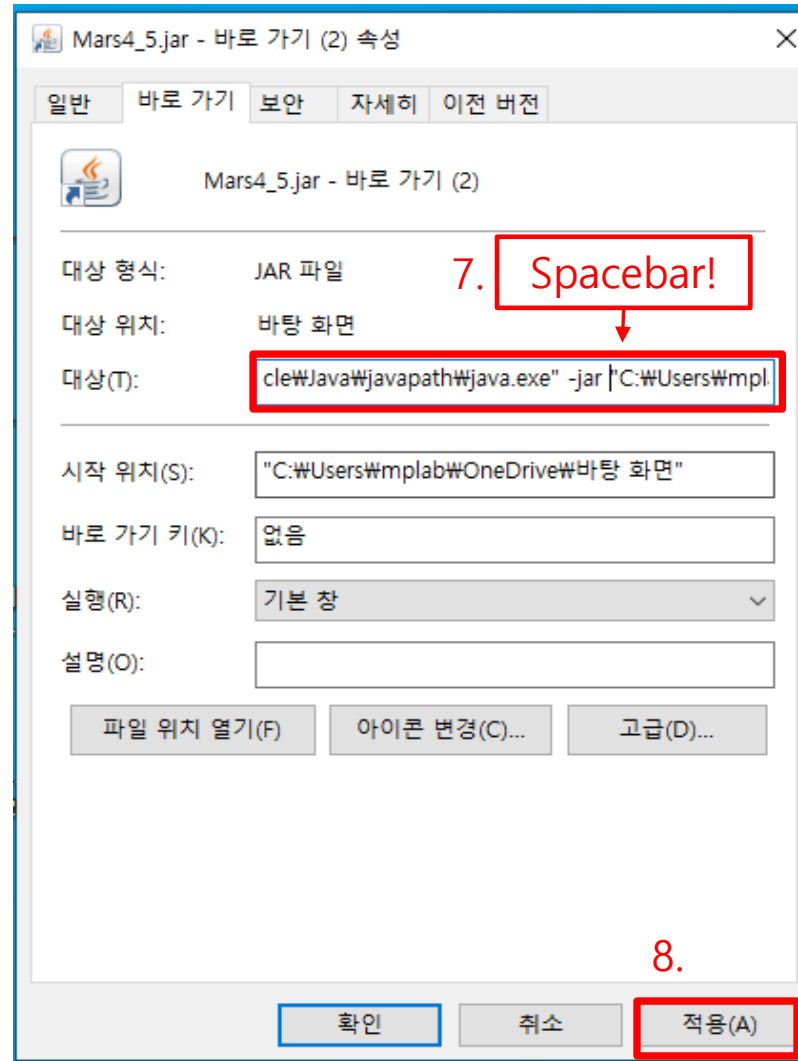
2.



# Mars 바로가기 만드는 법 (2/3)



# Mars 바로가기 만드는 법 (3/3)



**Thank You**