Practice Environment Setup for x86

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- Assembly Code Generation
- VMware Environment Setting

Tool

- **Editor**
  - Make a assembly code
  - We use ‘notepad++.exe’
- **NASM Compiler**
  - Make .asm file to bin file
  - We use ‘nasm-2.11.08-installer.exe’ (Download from I-Campus)
- **VMware**
  - Virtual machine to run .asm file
  - We use ‘VMware Workstation 12 Player’

Assembly Code Generation

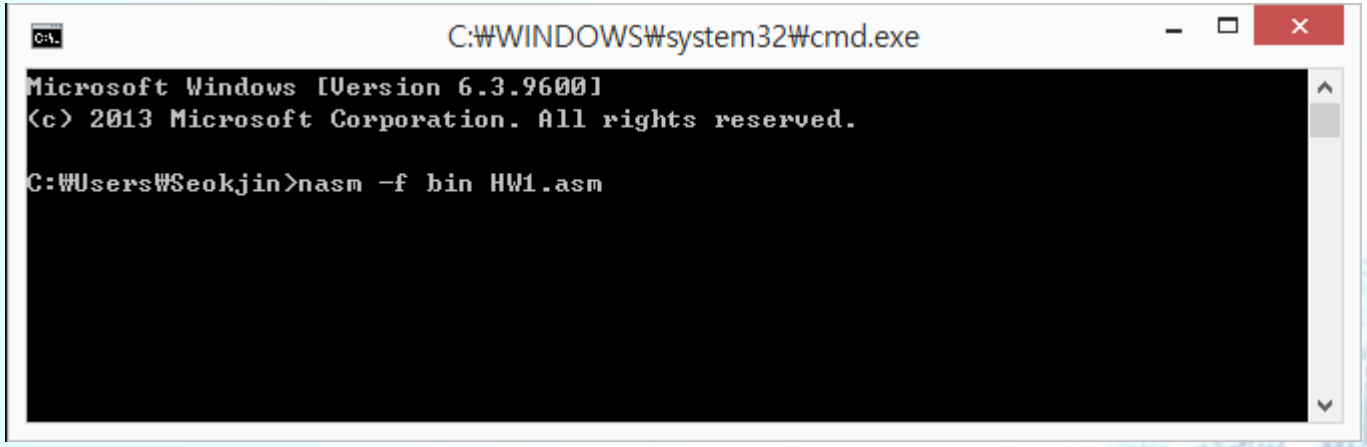
- **Assembly Code written in windows**
  - **Assembly code written in Notepad**
    - **Ex) HW1.asm file generation (Download from I-Campus : HW1.asm)**

```
[org 0x7c00]          ; Assembly command
                      ; Let NASM compiler know starting address of memory
                      ; BIOS reads 1st sector and copied it on memory address 0x7c00
[bits 16]             ; Assembly command
                      ; Let NASM compiler know that this code consists of 16its

[SECTION .text]       ; Text section

START:                ; Boot loader(1st sector) starts
    cli               ; Clear interrupt
    xor ax, ax        ; Initialize ax register
    mov ds, ax        ; Base address of data segment

;----------------------Write your code here-------------------------
;                                                                   ;
; Store the start address of Video Memory directly on ES Register ;
;                                                                   ;
;-------------------------------------------------------------------

    sti                     ; set interrupt

    call load_sectors       ; load rest sectors
    jmp sector_2

load_sectors:               ; read and copy the rest sectors of disk

    push es
    xor ax, ax
    mov es, ax                                  ; es=0x0000
    mov bx, sector_2                            ; es:bx, Buffer Address Pointer
    mov ah,2                                    ; Read Sector Mode
    mov al,(sector_end - sector_2)/512 + 1      ; Sectors to Read Count
    mov ch,0                                    ; Cylinder Number=0
    mov cl,2                                    ; Sector Number=2
    mov dh,0                                    ; Head=0
    mov dl,0                                    ; Drive=0, A:drive
    int 0x13                                    ; BIOS interrupt
                                                ; Services depend on ah value
    pop es
    ret

times   510-($-$$) db 0        ; $ : current address, $$ : start address of SECTION
                               ; $-$$ means the size of source
dw      0xAA55                 ; signature bytes
                               ; End of Master Boot Record(1st Sector)

sector_2:                      ; Program Starts
    cli

;----------------------Write your code here-------------------------
```

Compile the Assembly Code

- Compile the Assembly Code in windows
  - Install NASM compiler
    - Download from I-Campus : nasm-2.11.08-installer.exe
  - Run NASM compiler
  - Go to the path of the assembly code file
  - Compile the Assembly Code with the following command
    - nasm –f bin –o filename.bin filename.asm

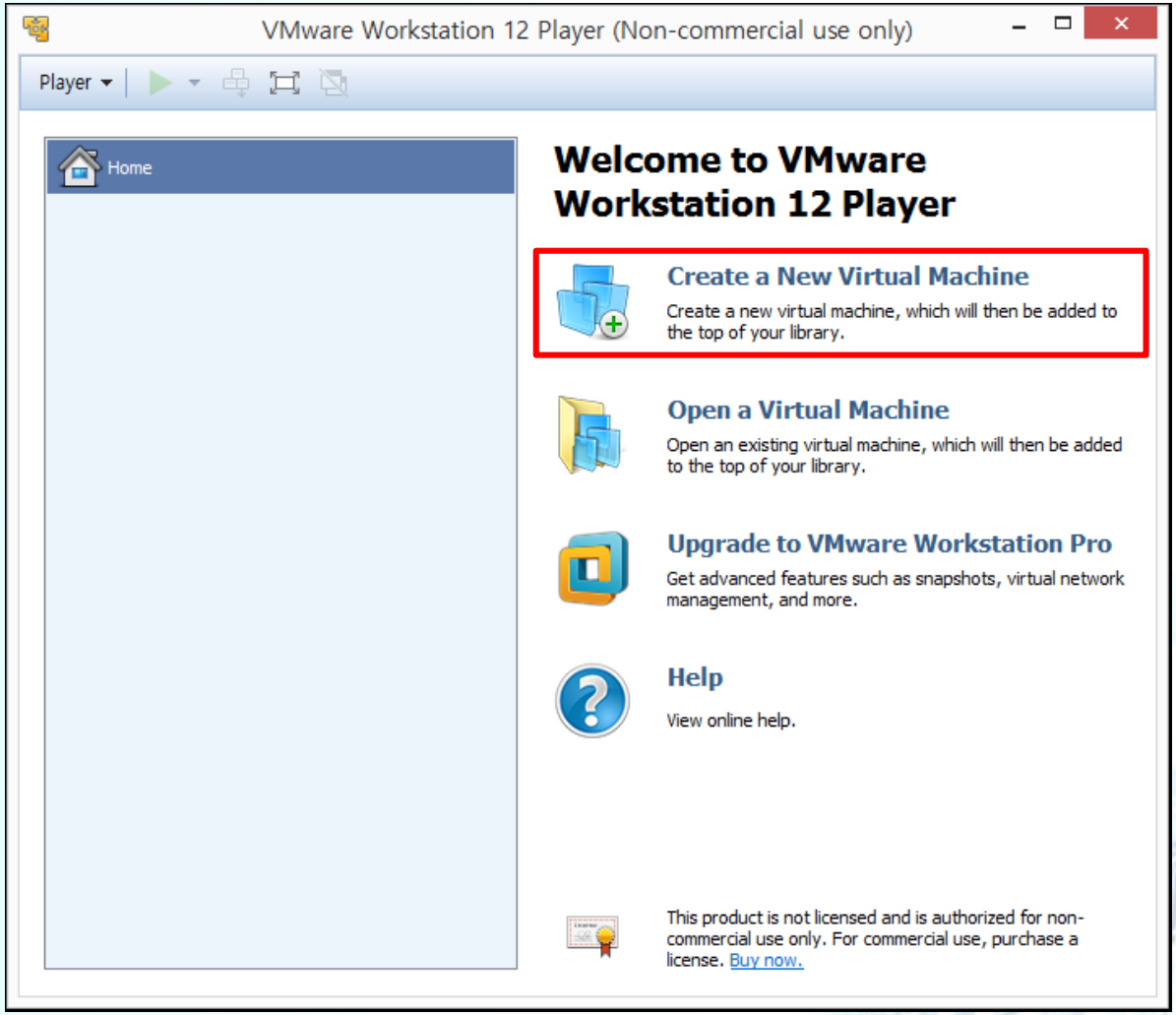
      → filename.bin file generation



VMware Environment Setting

VMware Configuration

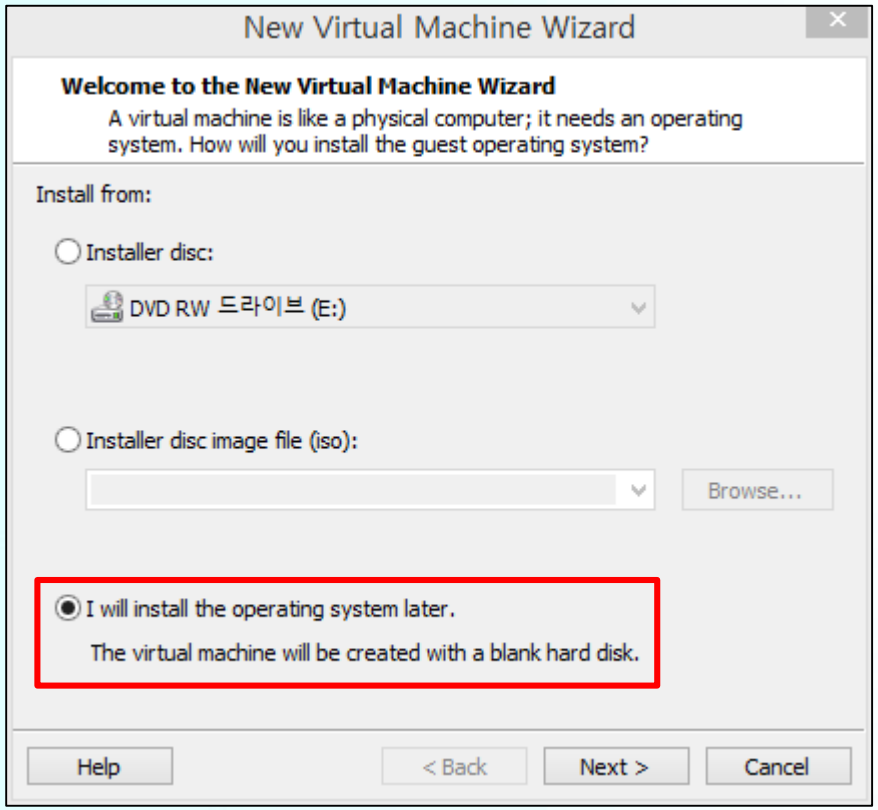
Create a New Virtual Machine Click

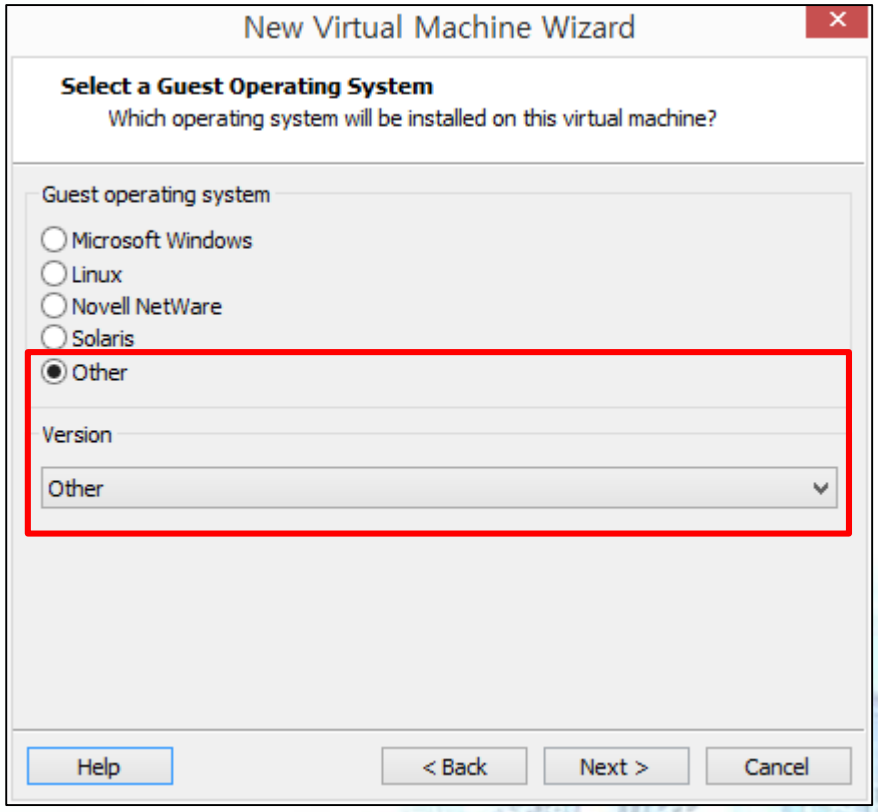


VMware Environment Setting

VMware Configuration

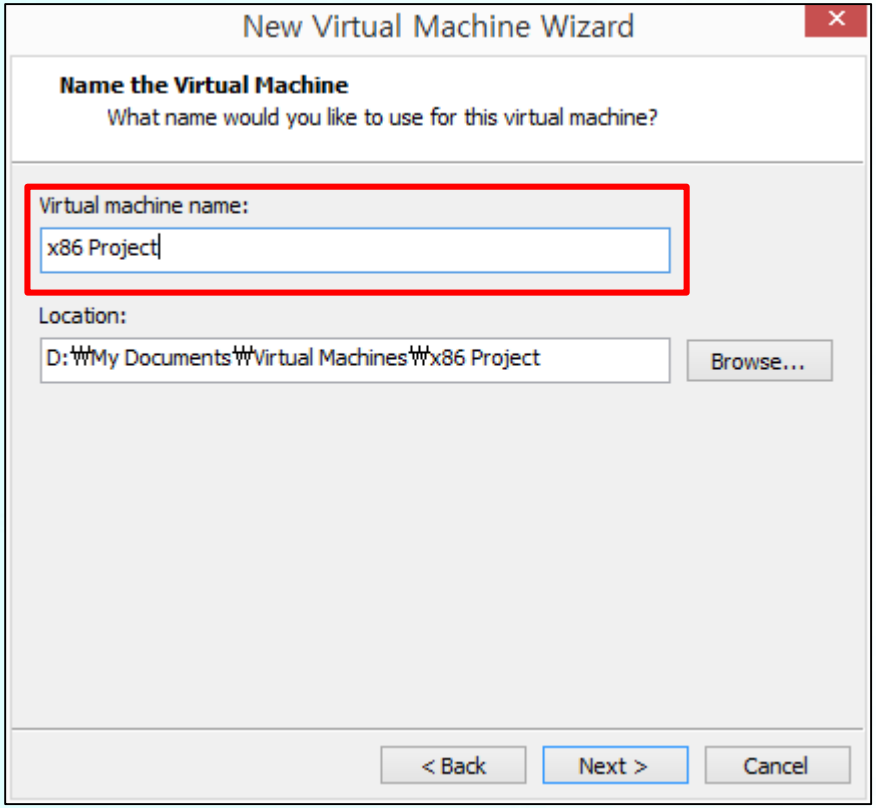
Select as shown below

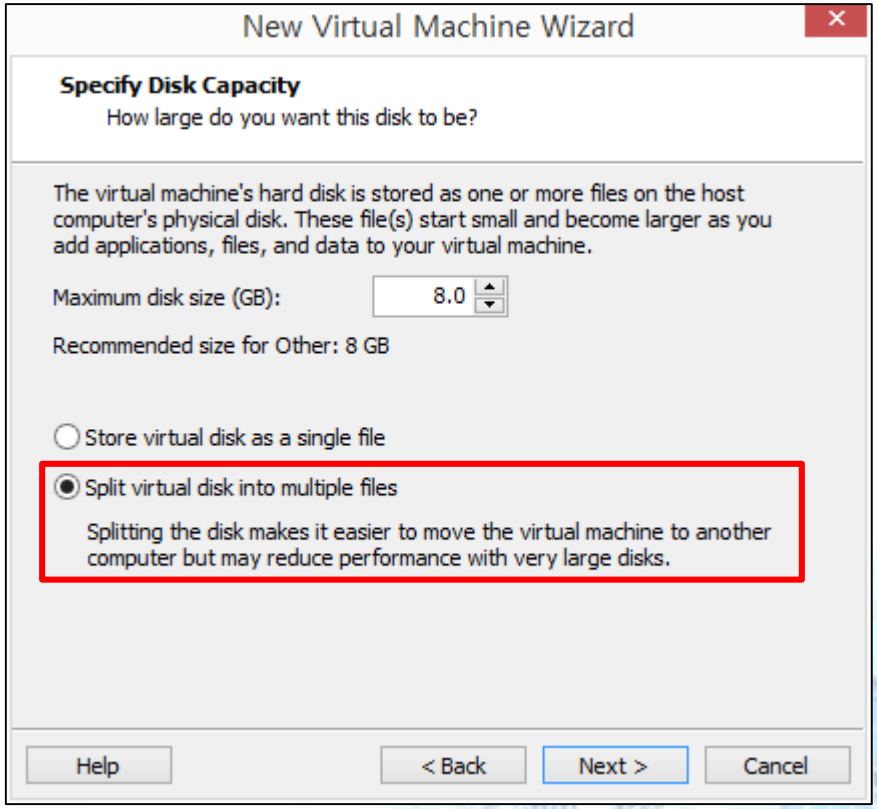




VMware Environment Setting

- **VMware Configuration**
  - **Write your machine name**
  - **Select as shown below**



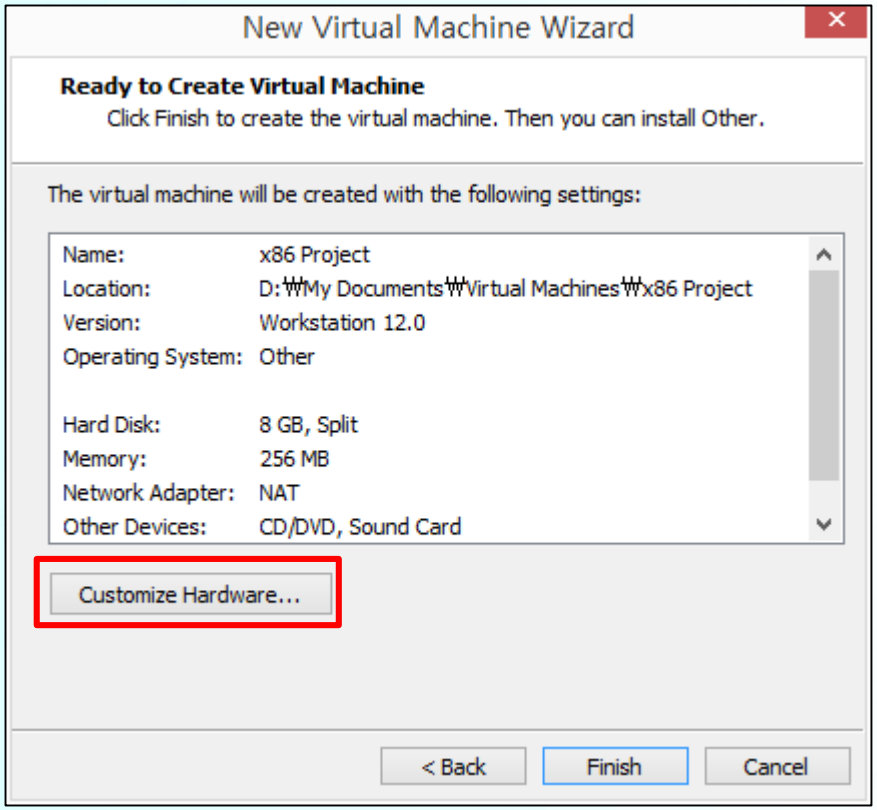


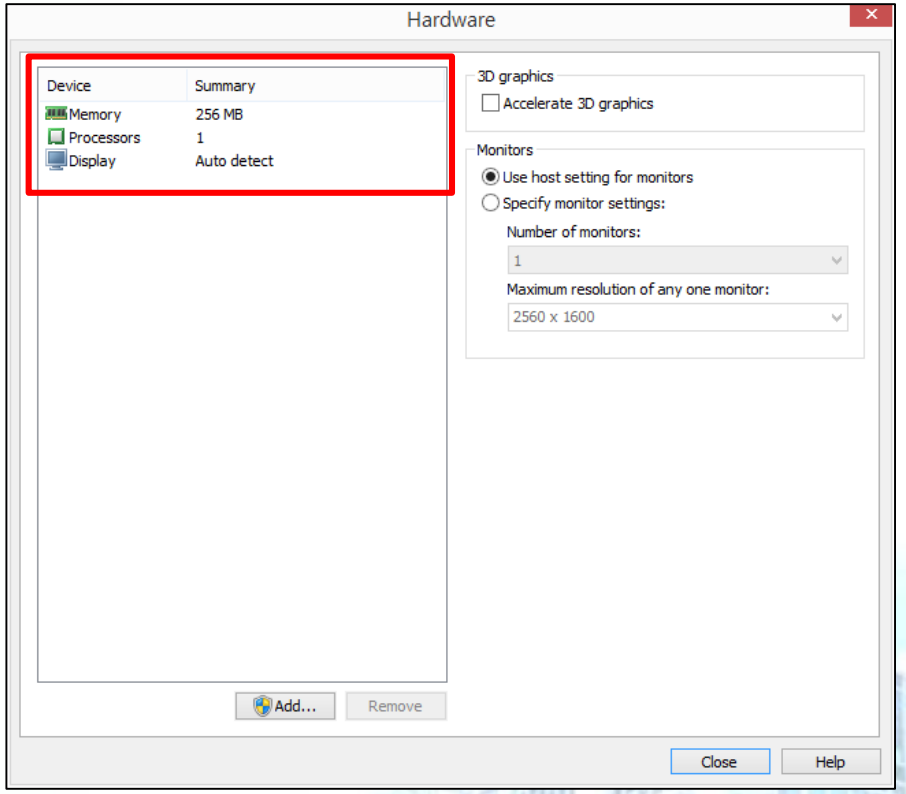
VMware Environment Setting

VMware Configuration

Select the device then remove using Remove button

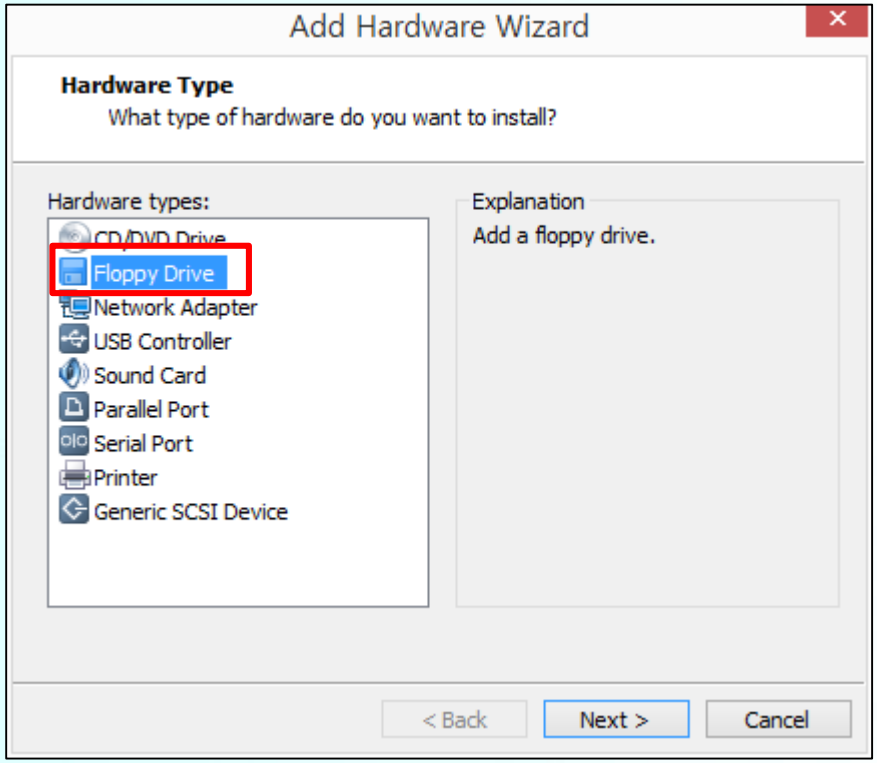
- Except for Memory, Processors, Display

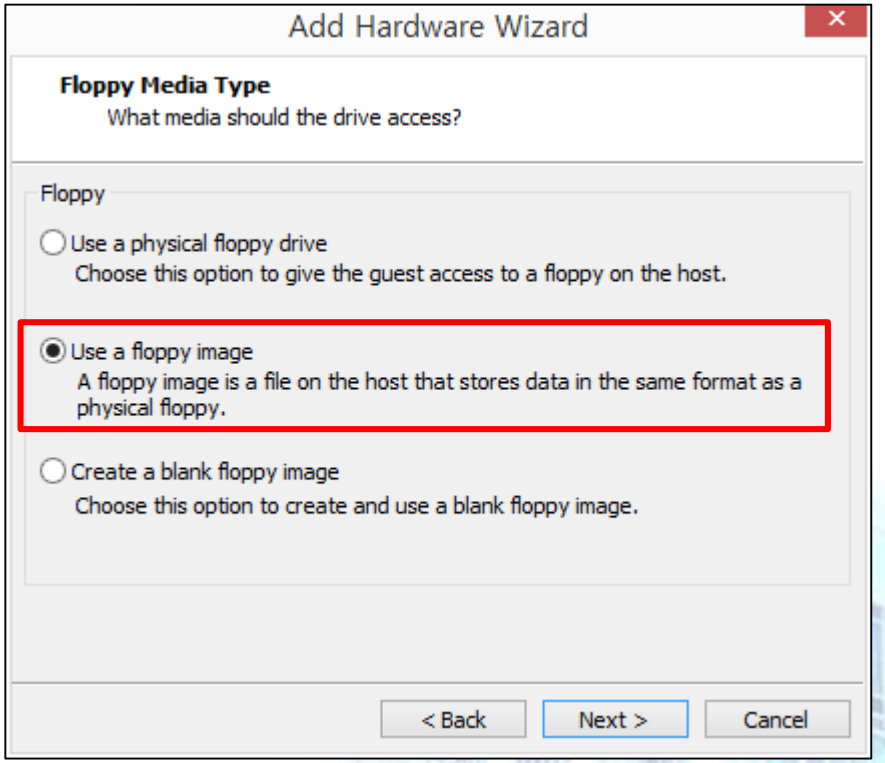




VMware Environment Setting

- **VMware Configuration**
  - **Add Floppy Drive device using Add button**
  - **Select as shown below**



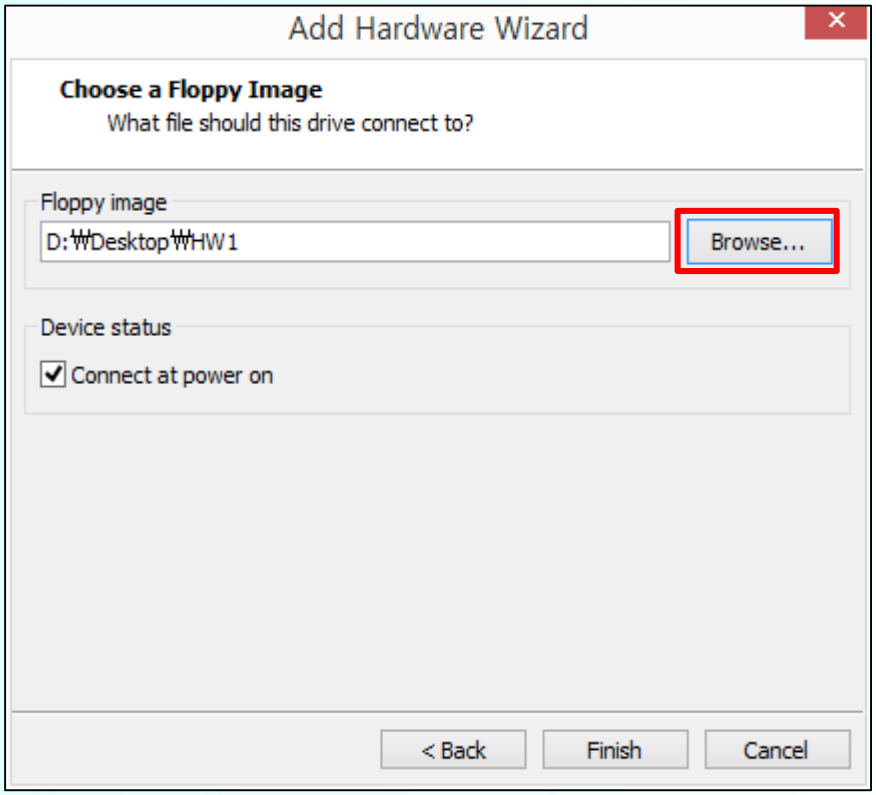


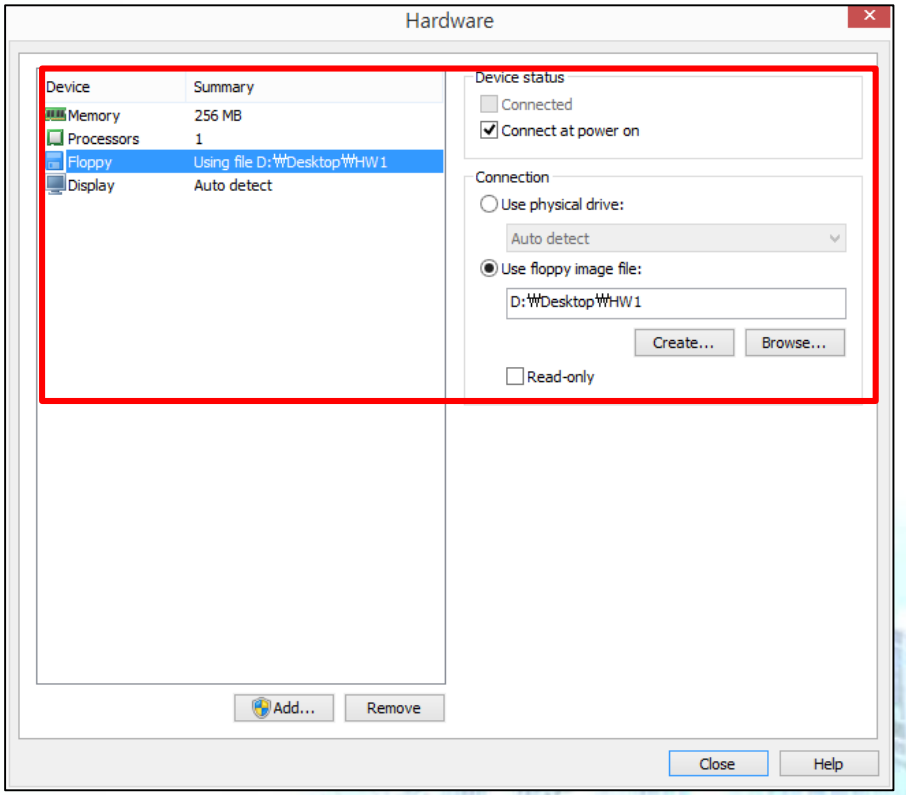
VMware Environment Setting

VMware Configuration

Import your test file(.bin file) to floppy

- Search and select any file format





VMware Environment Setting

- VMware Configuration Complete
  - Click the Play virtual machine button
  - Then VMware will start your test.asm code