CSC 3210
Computer Organization and Programming

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Department of Computer Science

Georgia State University

Lab Work 1

Lab work 1 instructions

- Lab 1(a) – Machine Setup and Microsoft Visual Studio installation (5 points)
- Lab 1 (b) – Solve three math problems (5 points)
- Lab attendance – (5 points)

- Due date – posted in iCollege.

Lab 1 (a)

Install Microsoft Visual Studio

Disclaimer: The process shown in these slides might not work in every single computer due to different Operating system versions, Microsoft Visual Studio versions and everything.

If you find any unusual error, you can inform the instructor.

Instructor will help you resolve the issue.

Lab 1(a) - Instructions

- The Lab Teaching Assistant (TA) will demonstrate the installation process of Microsoft Visual Studio on both Windows and Mac machine.

- Task: (5 points)
  - Install visual Studio Community 2019
- Submission Instruction:
  - Finish the installation of visual studio 2019
  - Run visual studio
  - Take a screenshot
  - Submit to the dropbox at iCollege

Lab 1 - Outline

- Windows users –
  - Skip (Slide 7 to Slide 36)
  - Install Microsoft visual Studio (Slide 38 to Slide 46)
- MacOS users -
  - Microsoft visual studio does not provide all libraries for Mac OS.
  - Don't install "Microsoft Visual Studio for Mac"
  - Setup a virtual machine that can run Windows inside MacOS
    - Slide 7 to slide 36
  - Install Microsoft Visual Studio inside your windows virtual machine (Side 37 to Slide 46)

Virtual Machine Setup (Mac OS)

Windows users do not need to do this

Windows users must skip Slide 7 to 36

Outline – Virtual Machine Setup (MacOS user only)

- Install Virtual Box in your Mac
- Download Windows 10 ISO
- Create a virtual machine (VM) in the Virtual Box
- Install Windows 10 in the virtual machine

(You need at least 50GB free hard disk space, 60GB is recommended)

Please make sure that you have enough disk space

IF you have Mac computer with M1 processor, this process might not work for you. In that case, contact the instructor.

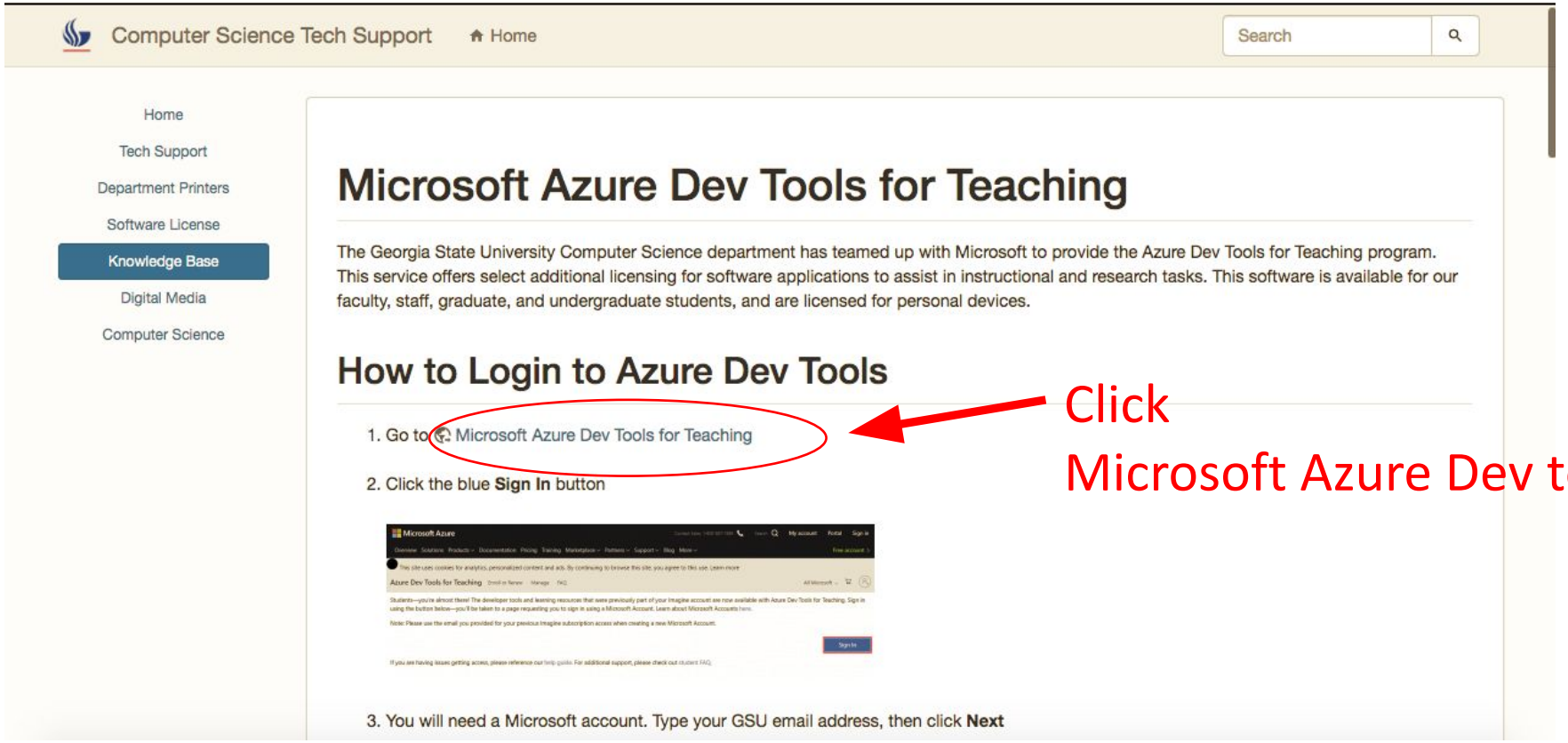
Install VirtualBox

- Go to https://www.virtualbox.org/wiki/Downloads

- Install the software

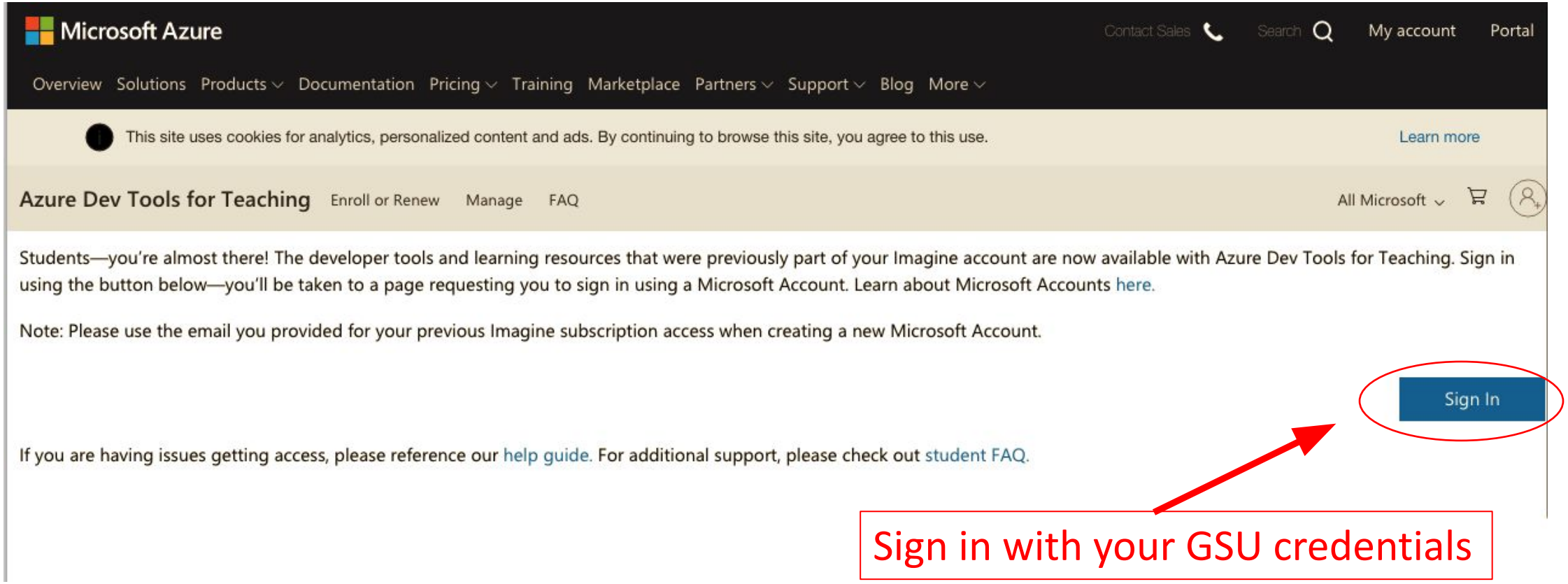
Download Windows 10 ISO (1)

- Go to : https://cscit.cs.gsu.edu/sp/guide/msazure

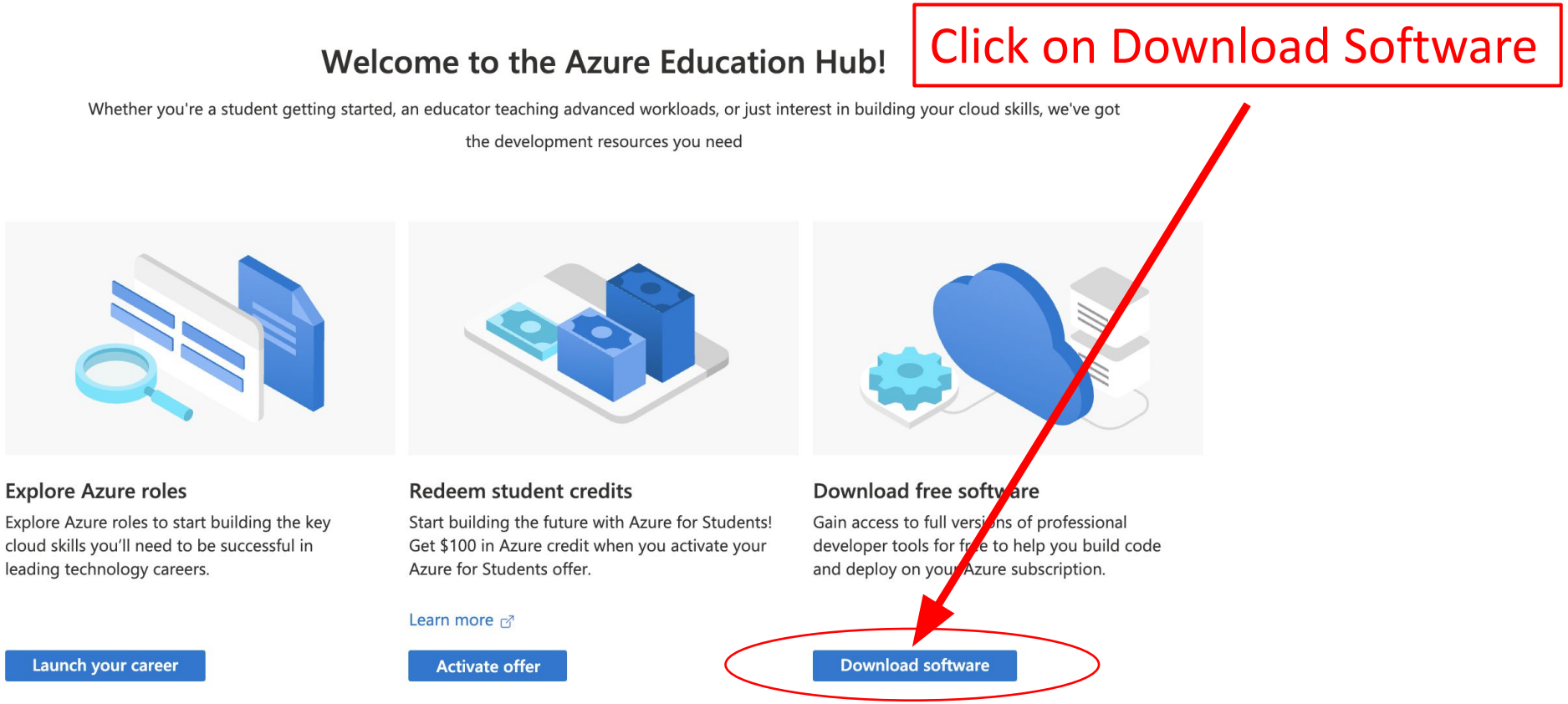


Click
Microsoft Azure Dev tools for Teaching

Download Windows 10 ISO (2)

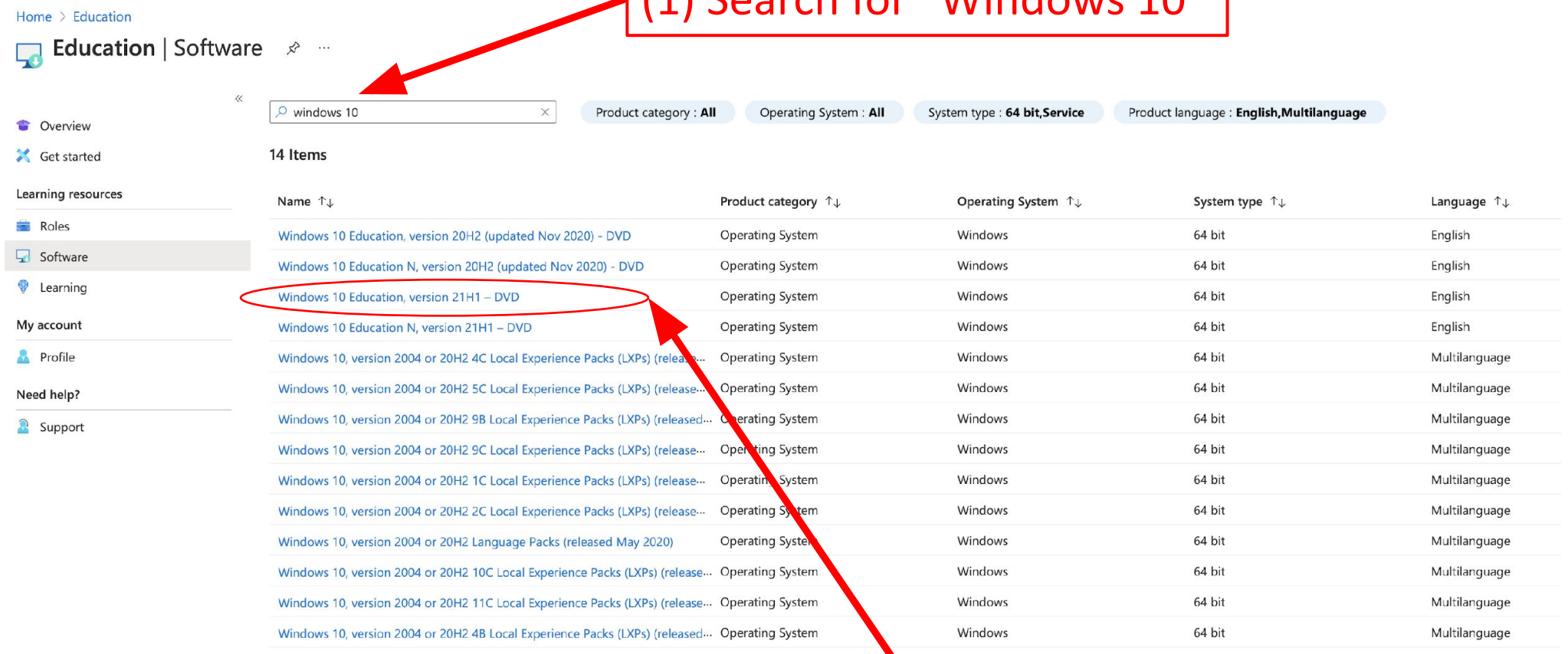


Download Windows 10 ISO (3)



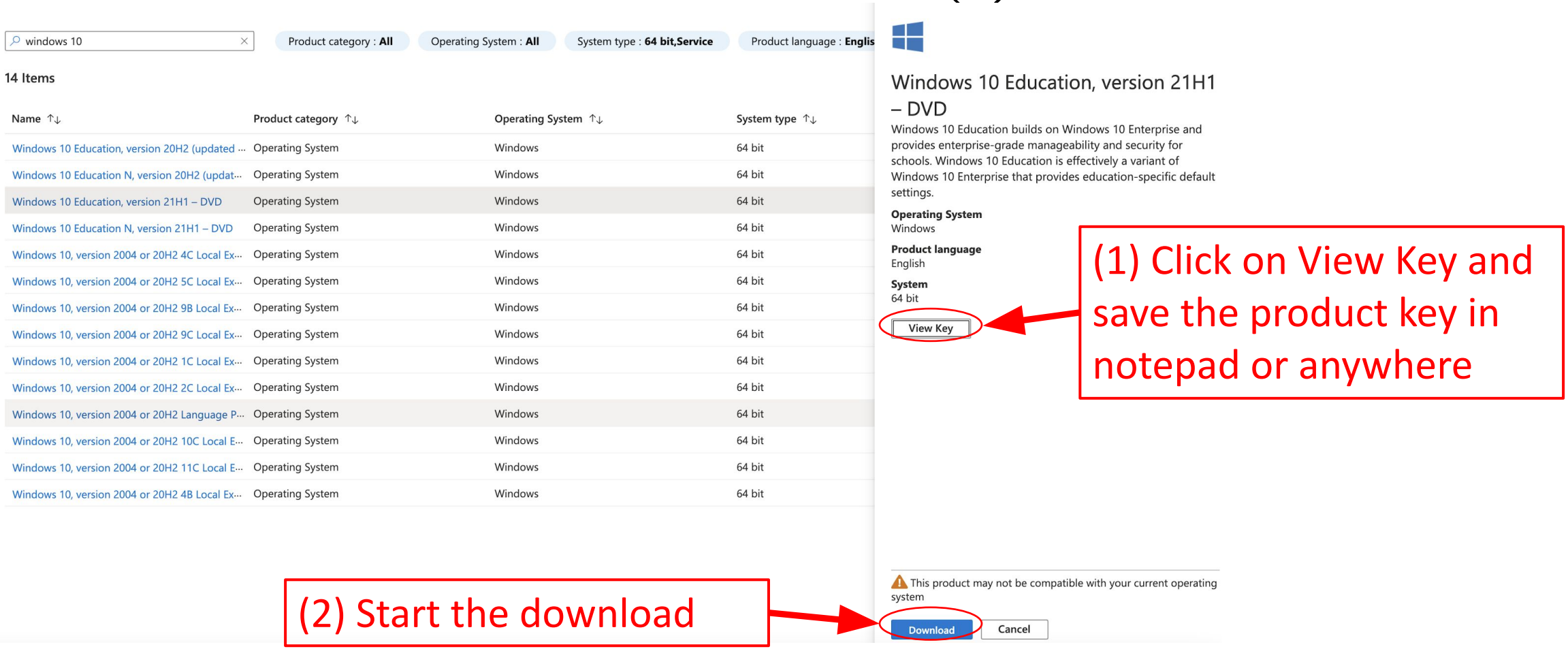
Download Windows 10 ISO (4)

(1) Search for ”Windows 10”



(2) Select Windows 10 Education, version 21H1 - DVD

Download Windows 10 ISO (5)

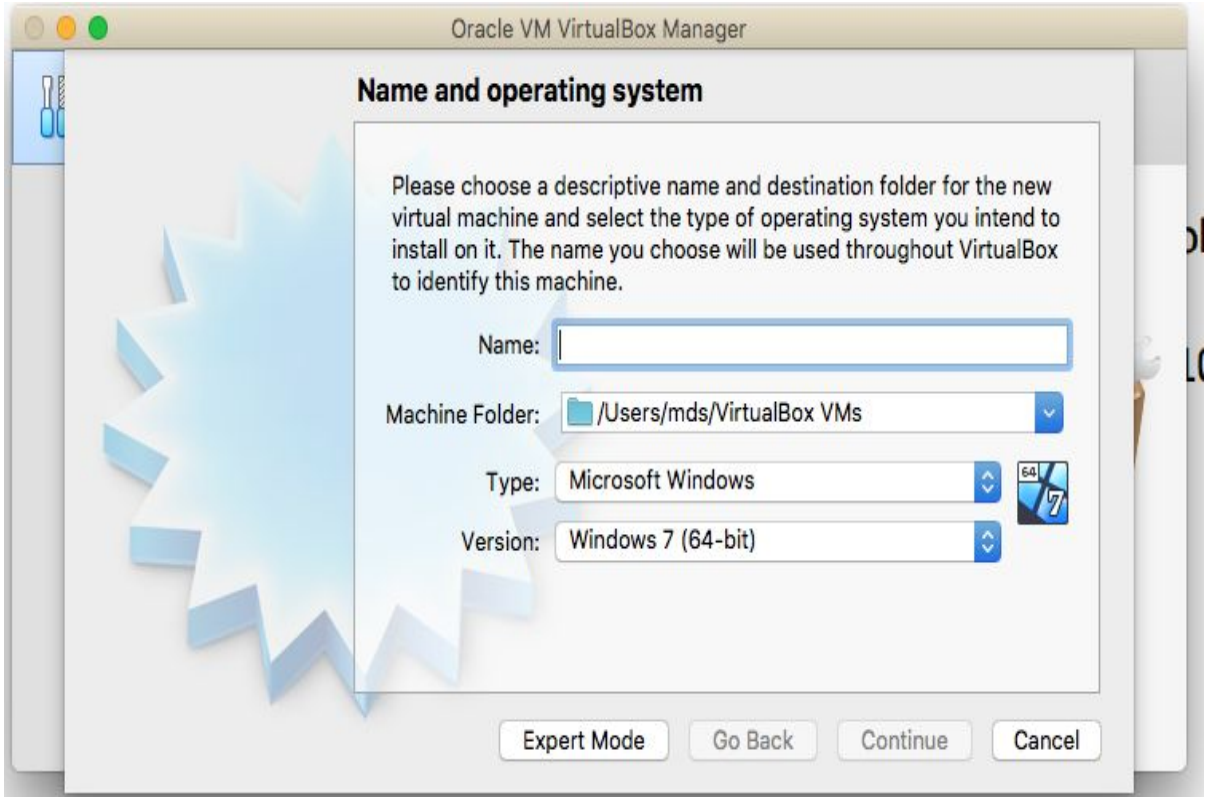


Create a virtual machine (1)

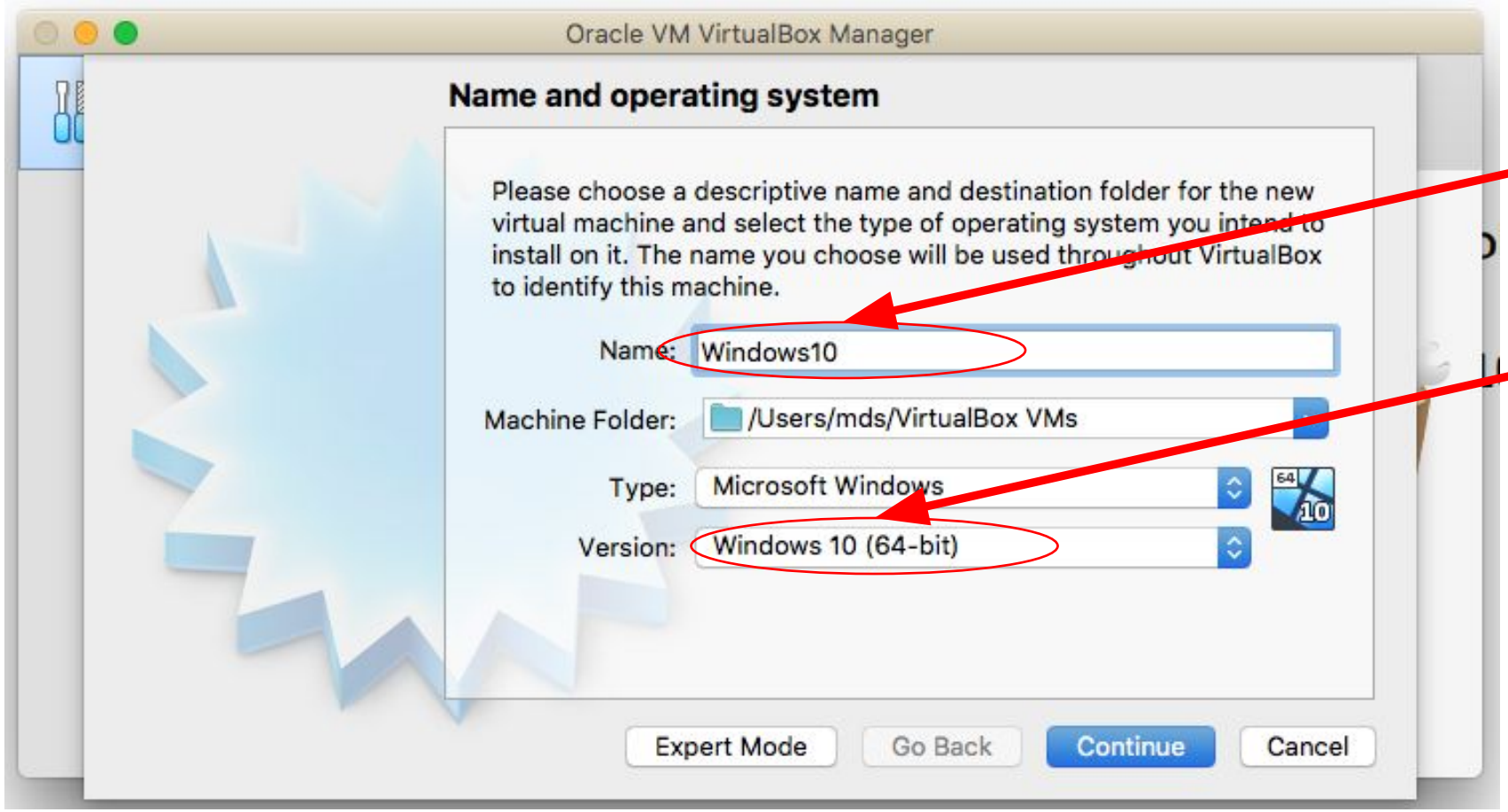
- Open the Virtual box

Create a virtual machine (2)

- Make sure the “Type” is set to Microsoft Windows
- And the version windows 10
  - 64 bit means a 64 bit VM
  - X86 means a 32 bit VM.



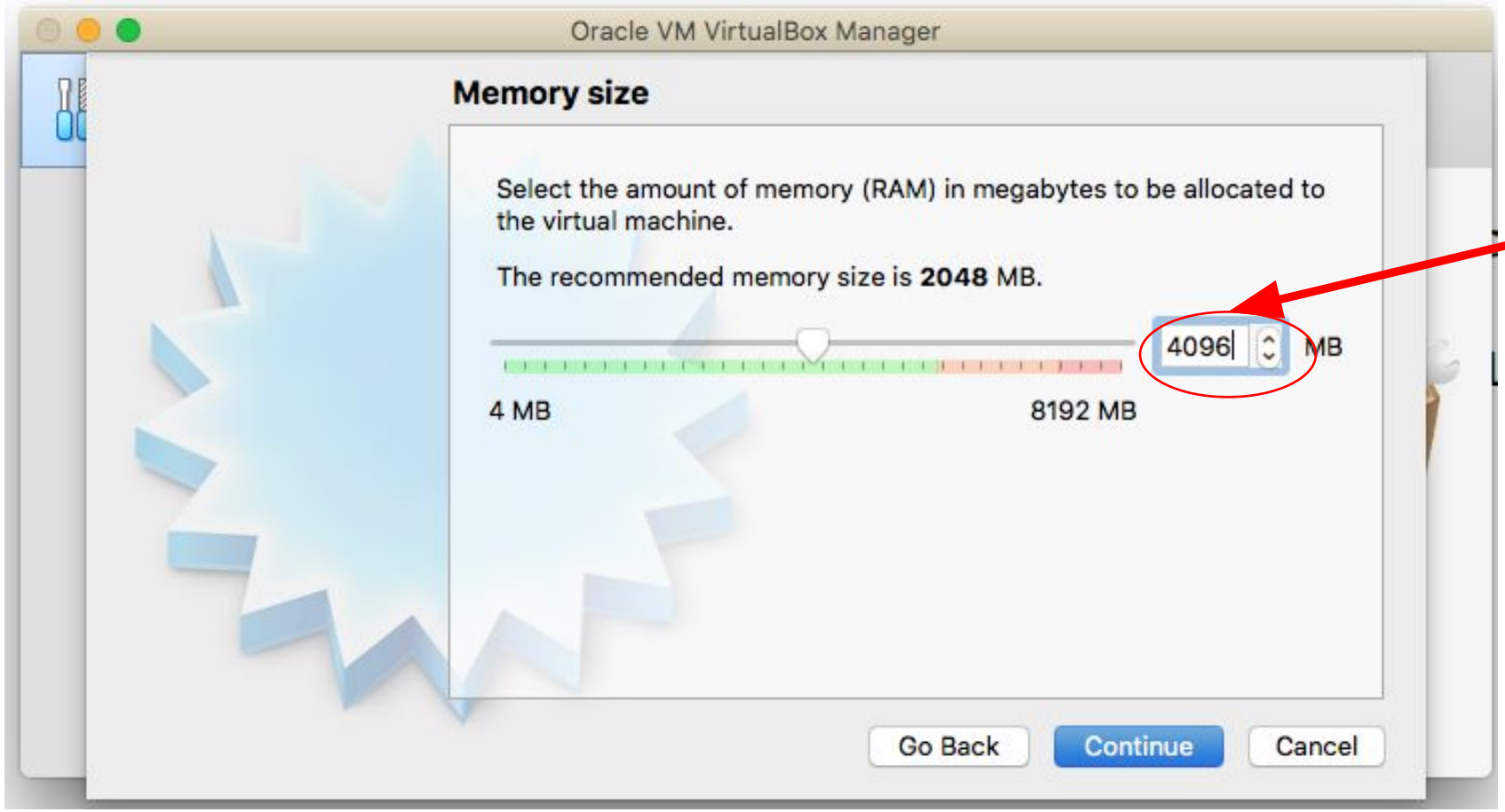
Create a virtual machine (3)



Name your VM

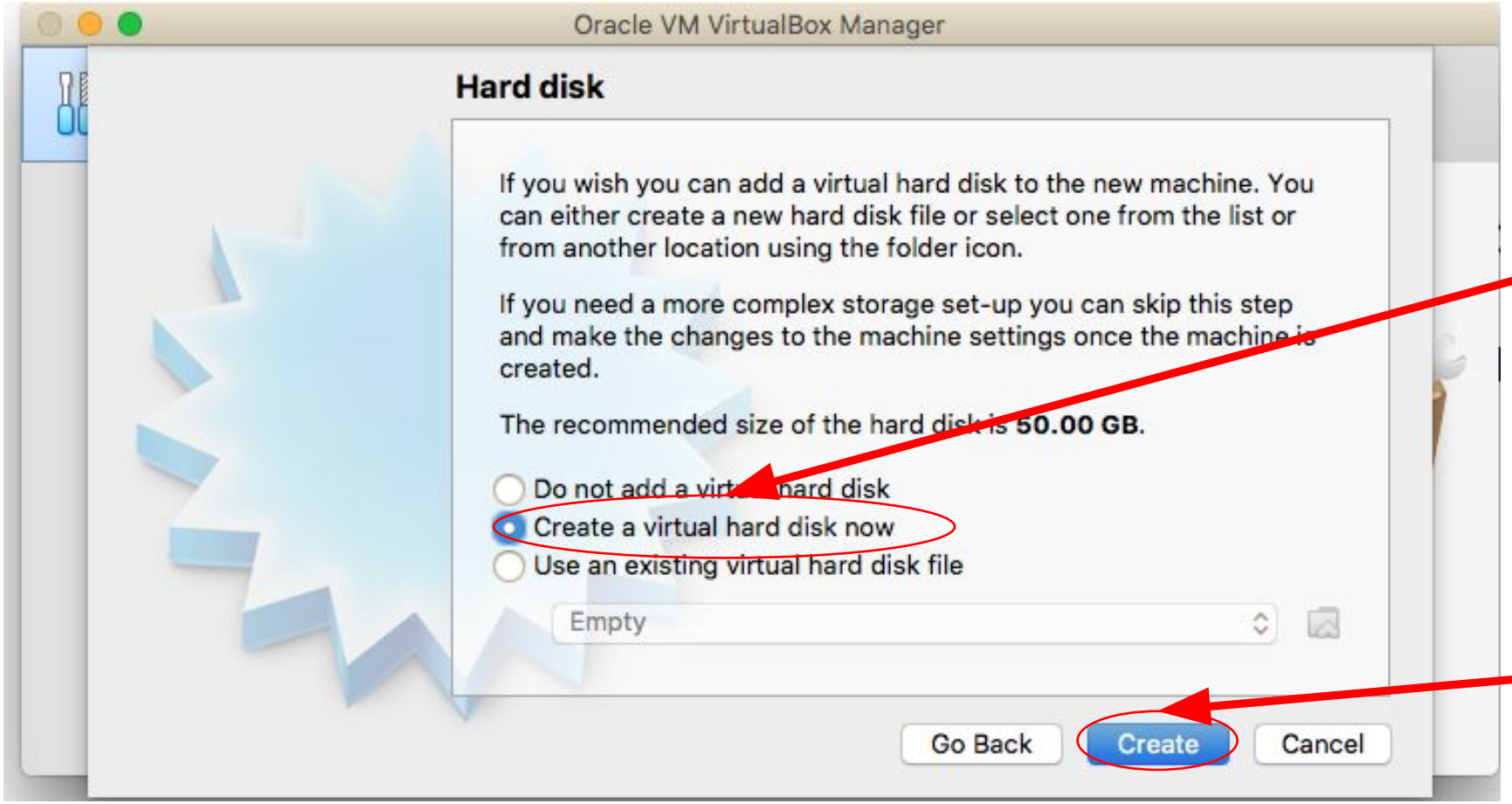
Make sure it is Windows 10

Create a virtual machine (4)



Select memory size
(4GB or more)

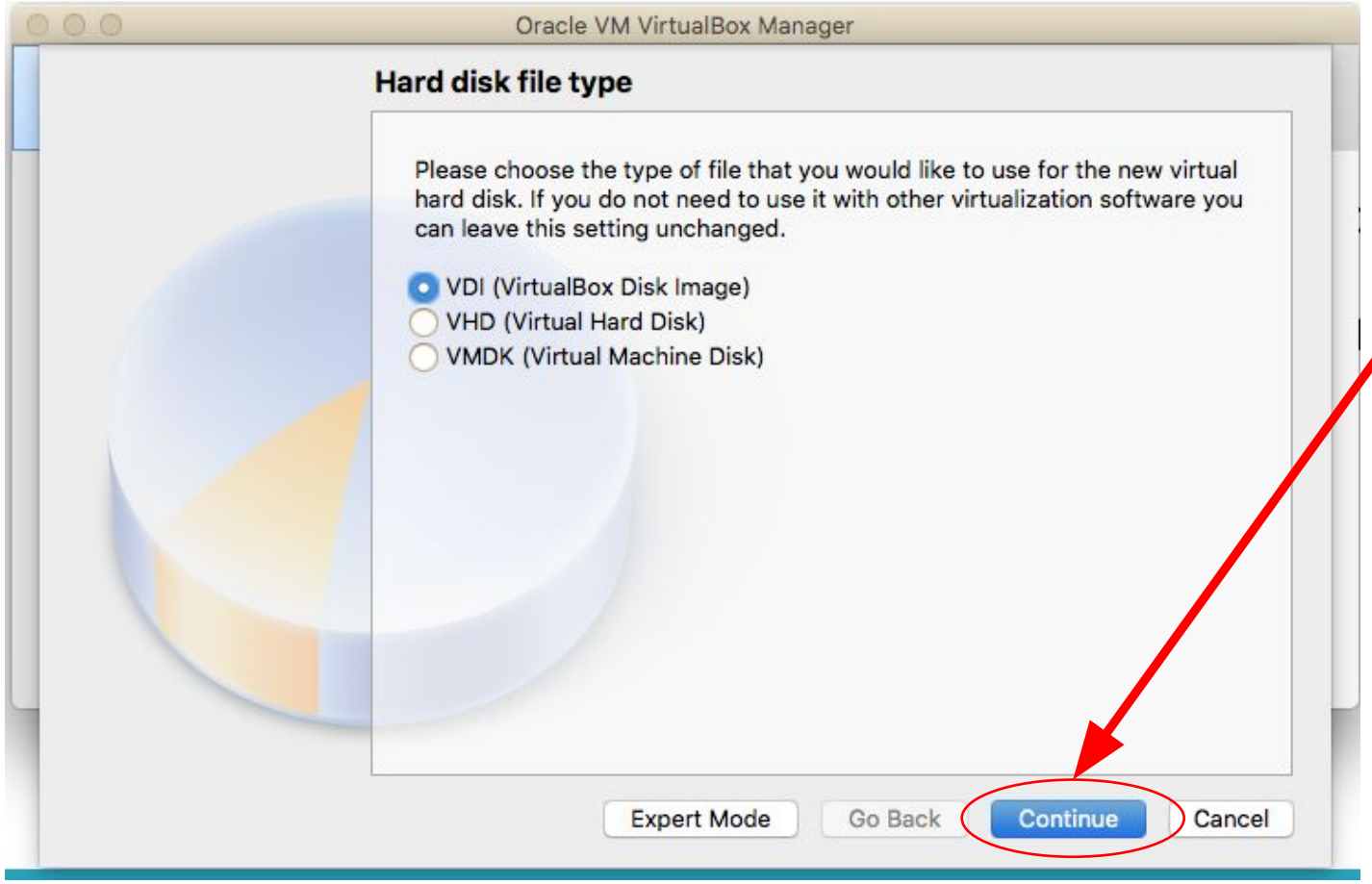
Create a virtual machine (5)



(1)Create a virtual hard disk of size at least 50 GB.
60GB is recommended.
Make sure that you have enough space in the hard drive

(2) Click Create

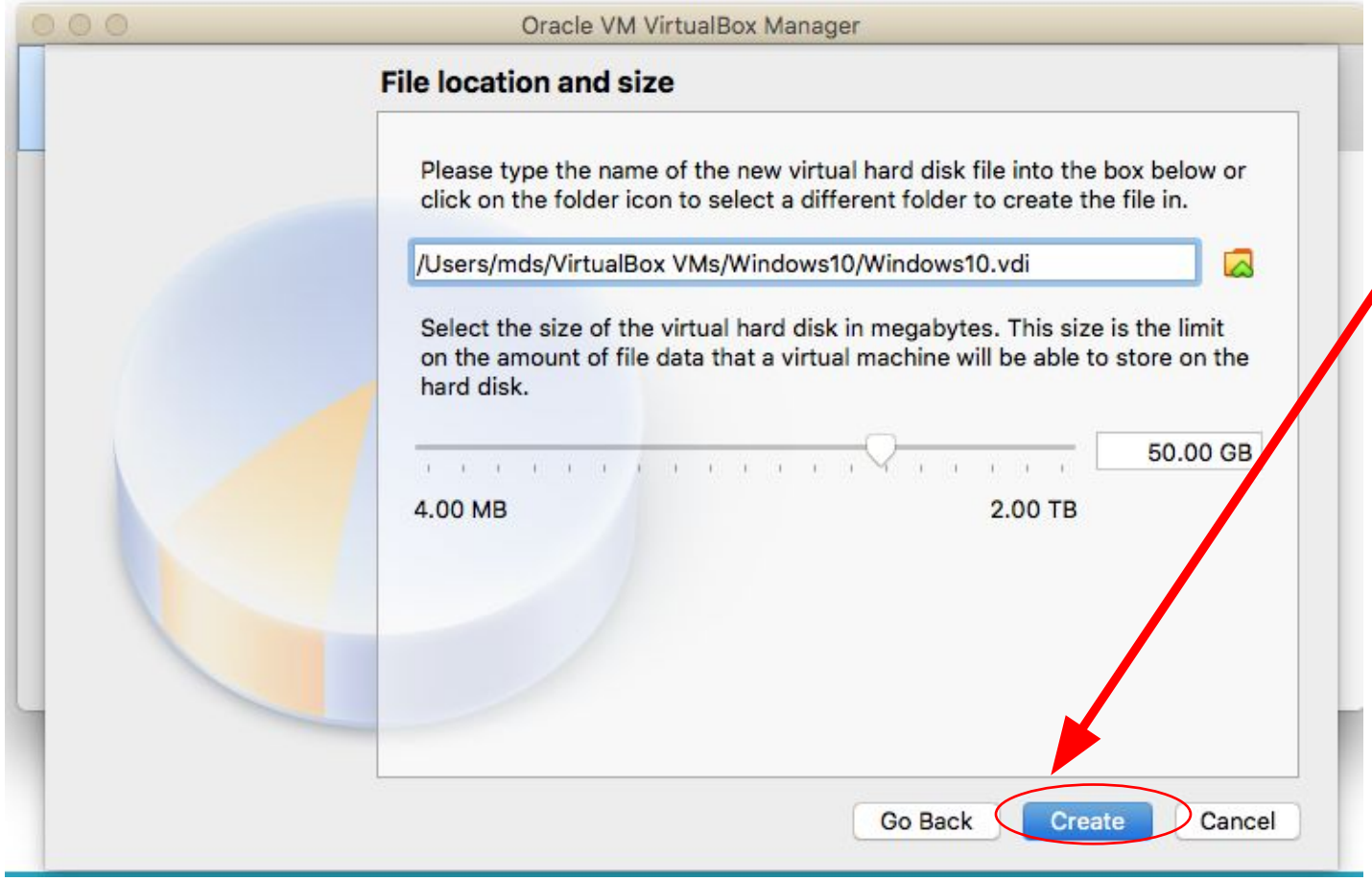
Create a virtual machine (6)



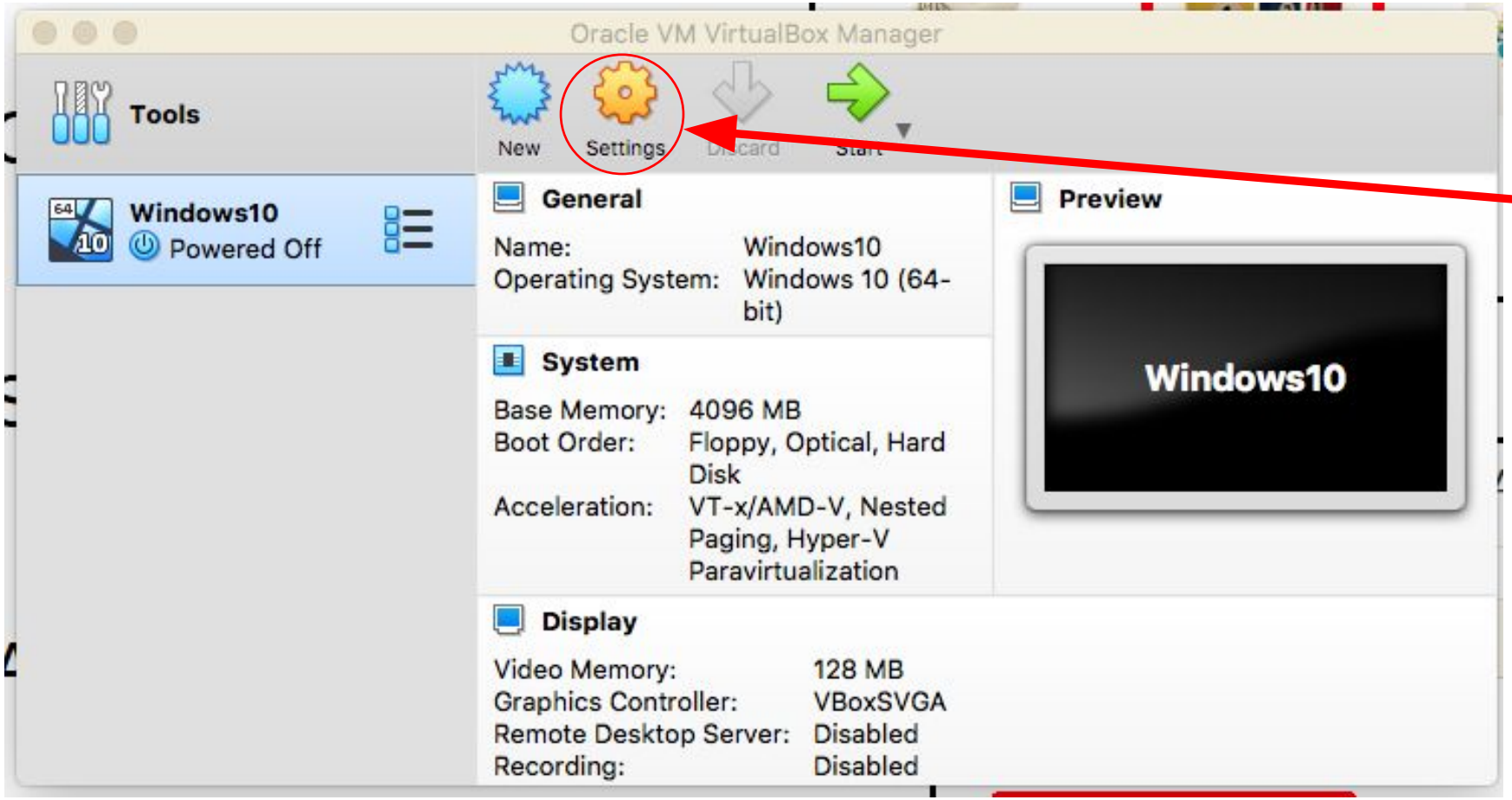
Click Continue

Create a virtual machine (7)

Create a virtual machine (8)

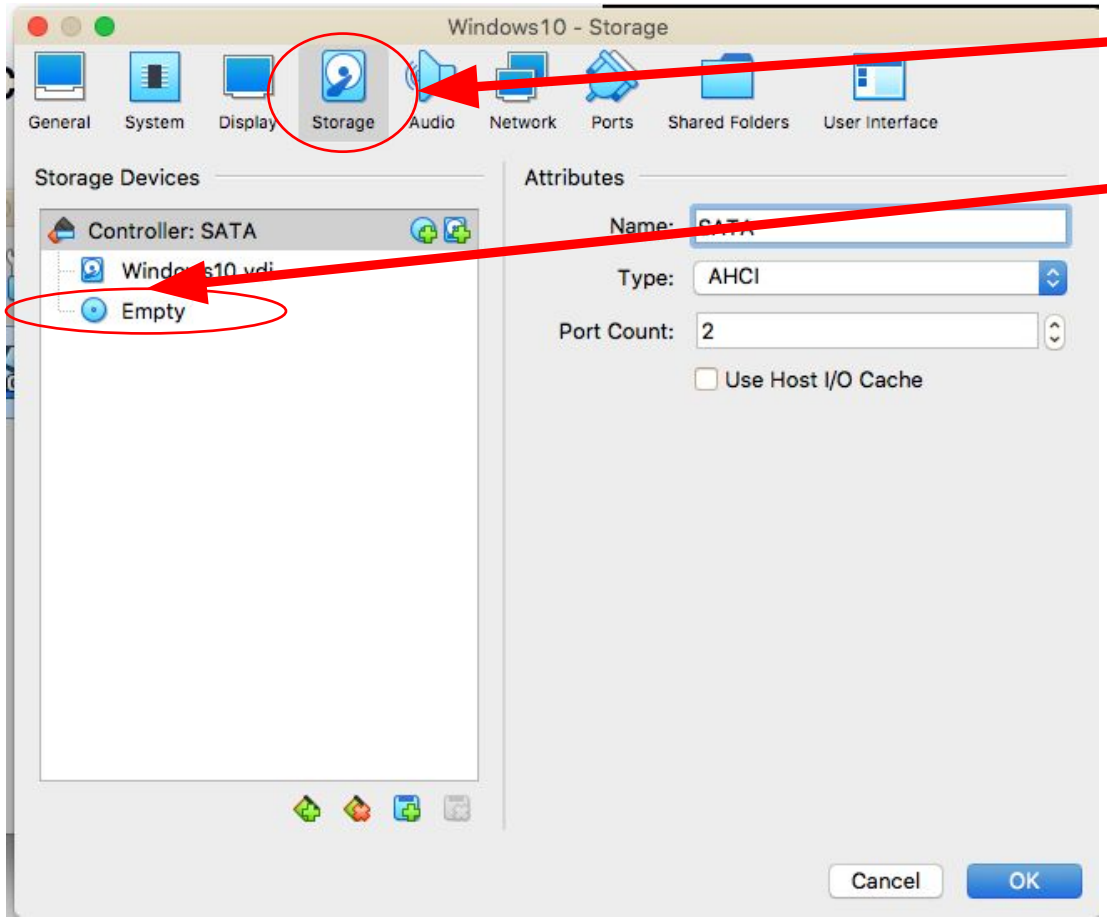


Install Windows 10 in VM (1)



Click on settings

Install Windows 10 in VM (2)

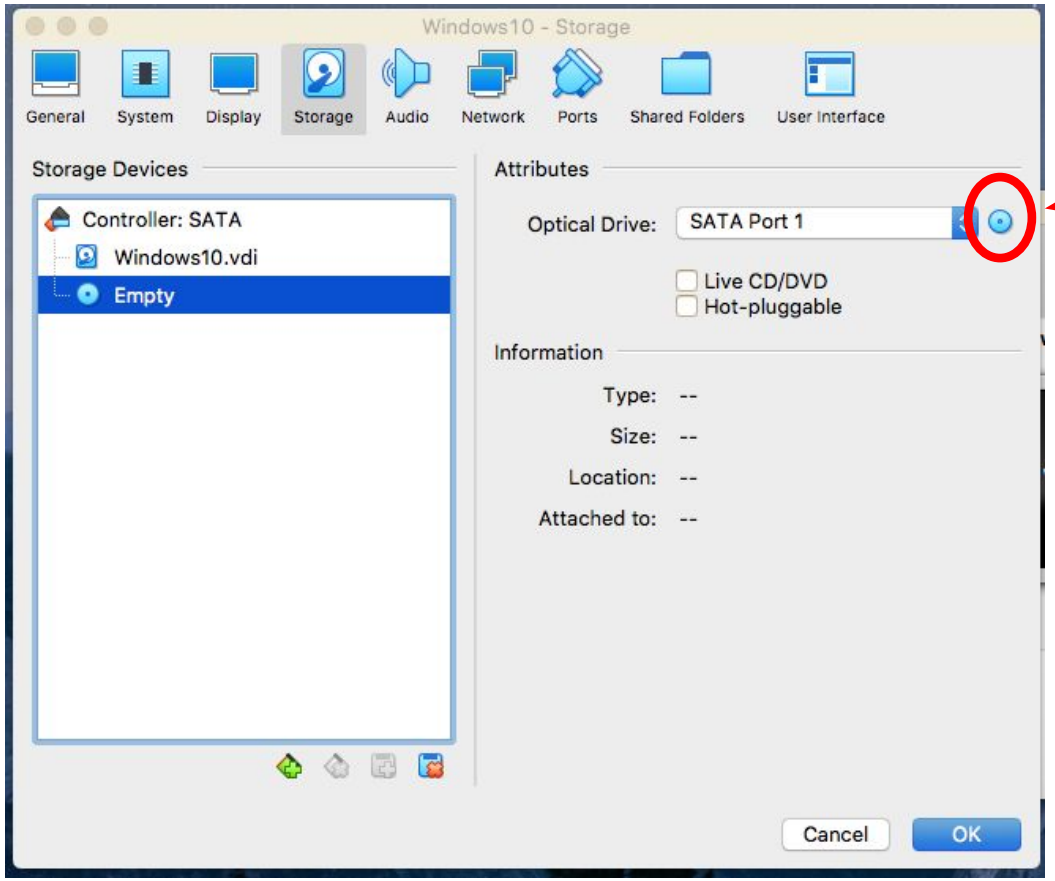


(1) Select storage

(2) Click the disk icon

Note : Here you load the windows iso file

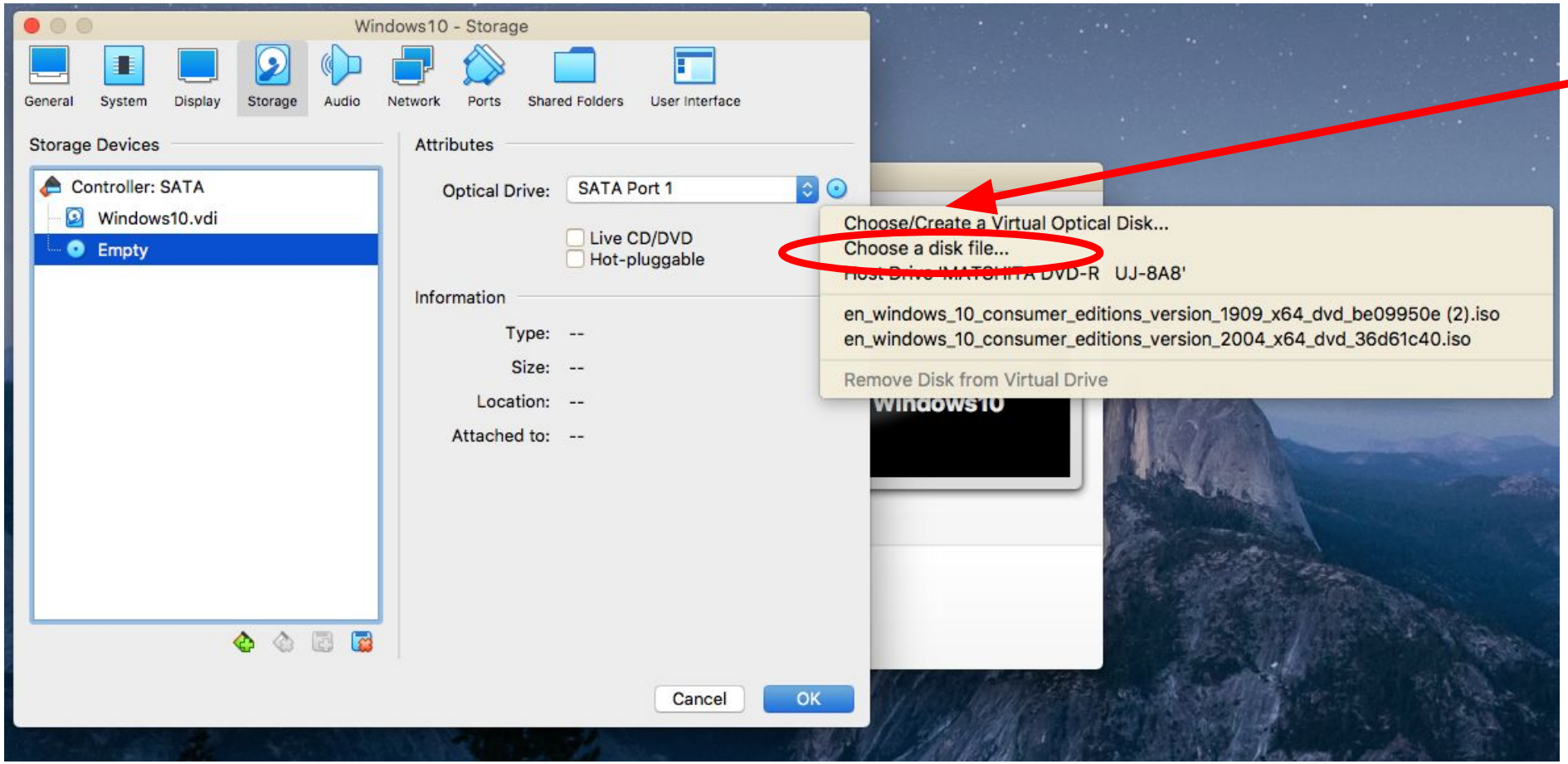
Install Windows 10 in VM (3)



Click the disk icon

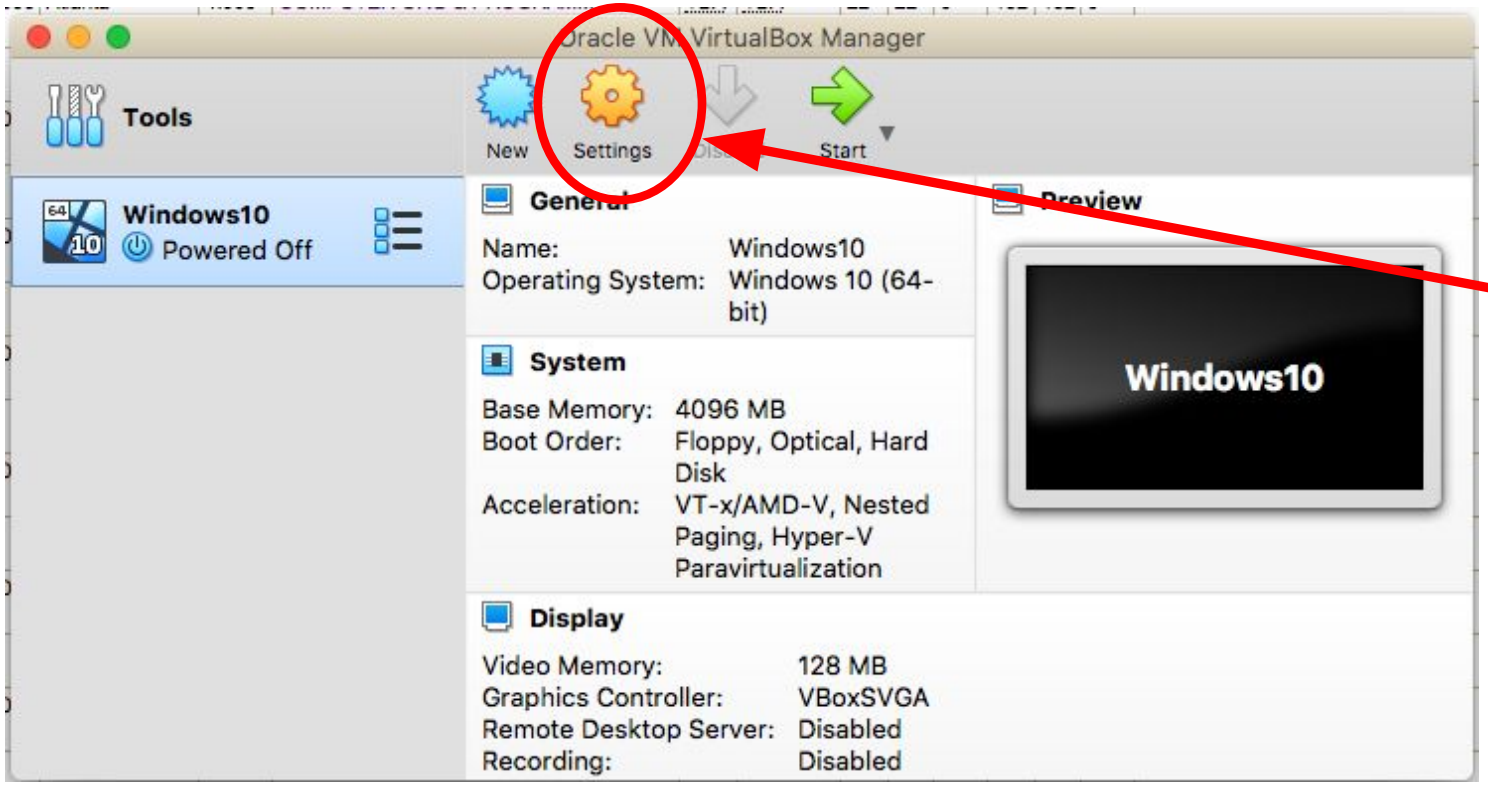
Note: It will show you options to load Windows ISO file.

Install Windows 10 in VM (4)



Select the ISO file from the directory

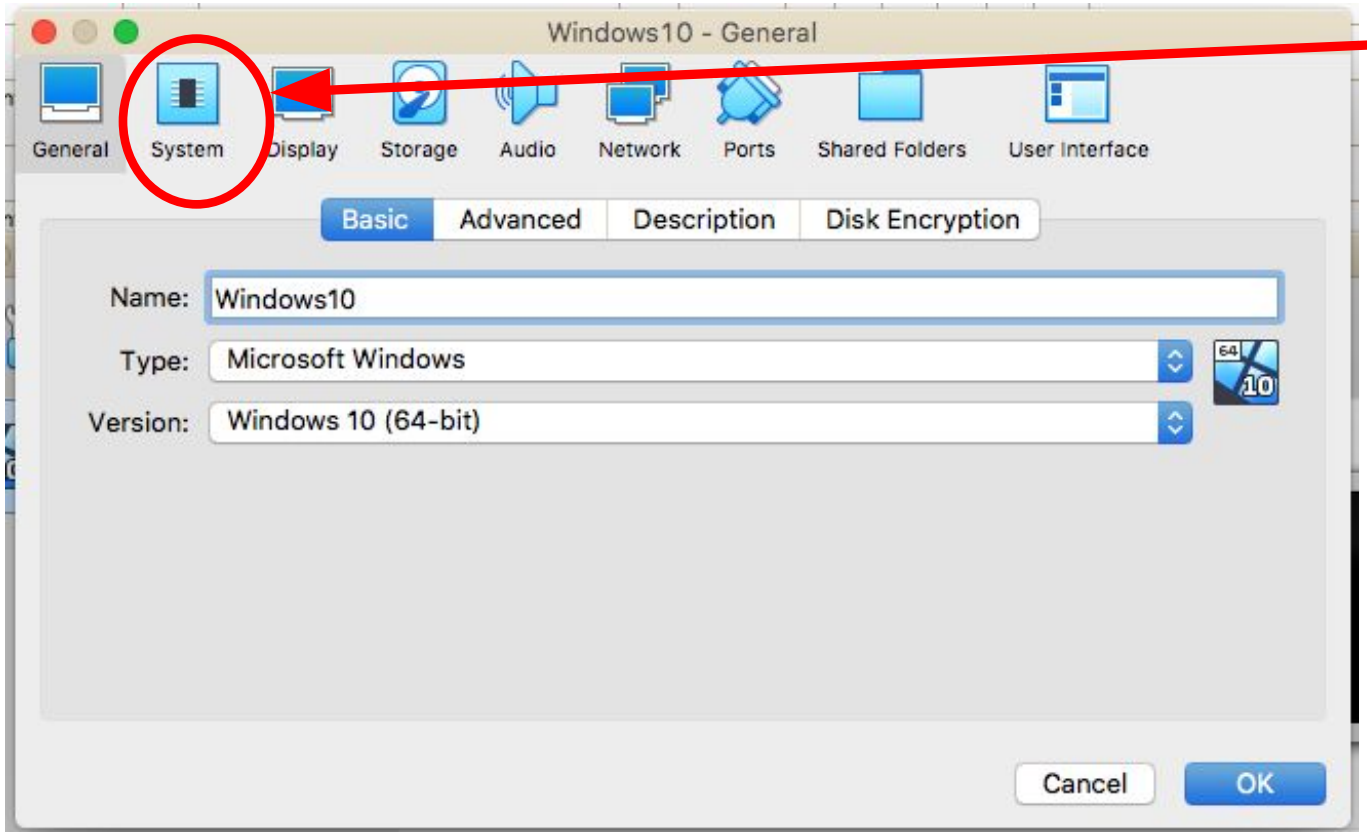
Install Windows 10 in VM (5)



Click settings

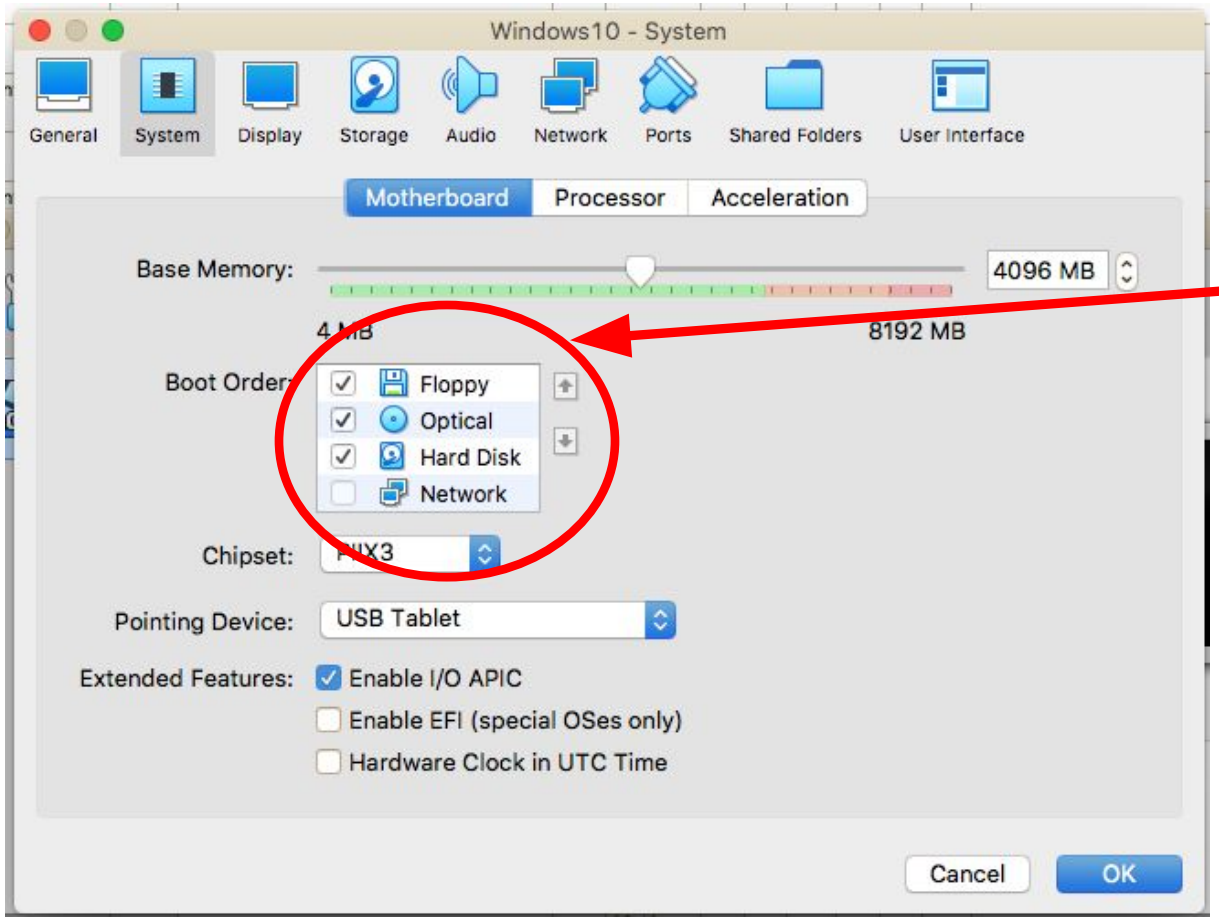
Note : Check the boot order

Install Windows 10 in VM (7)



Click System

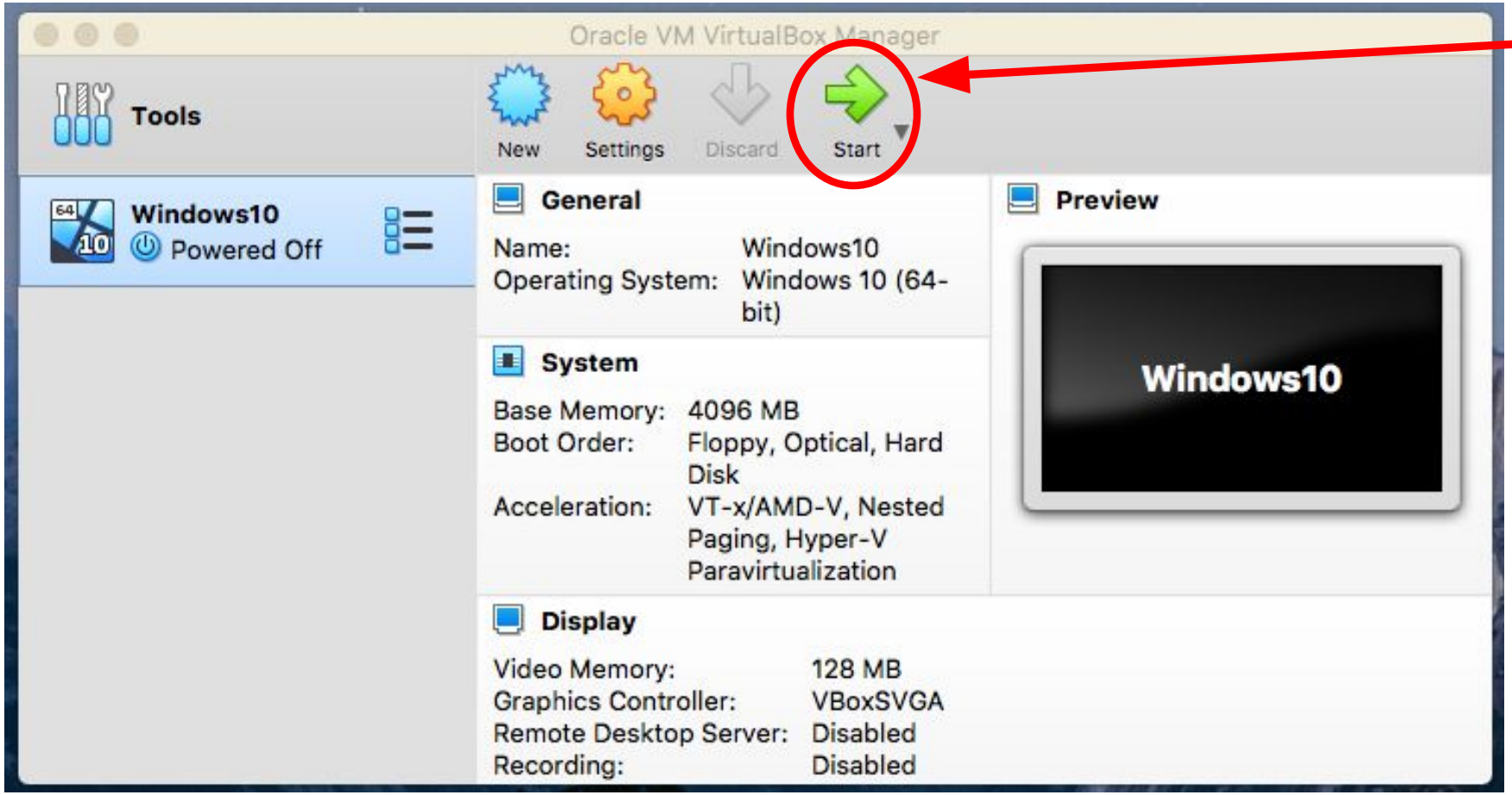
Install Windows 10 in VM (8)



Boot order should be like this.

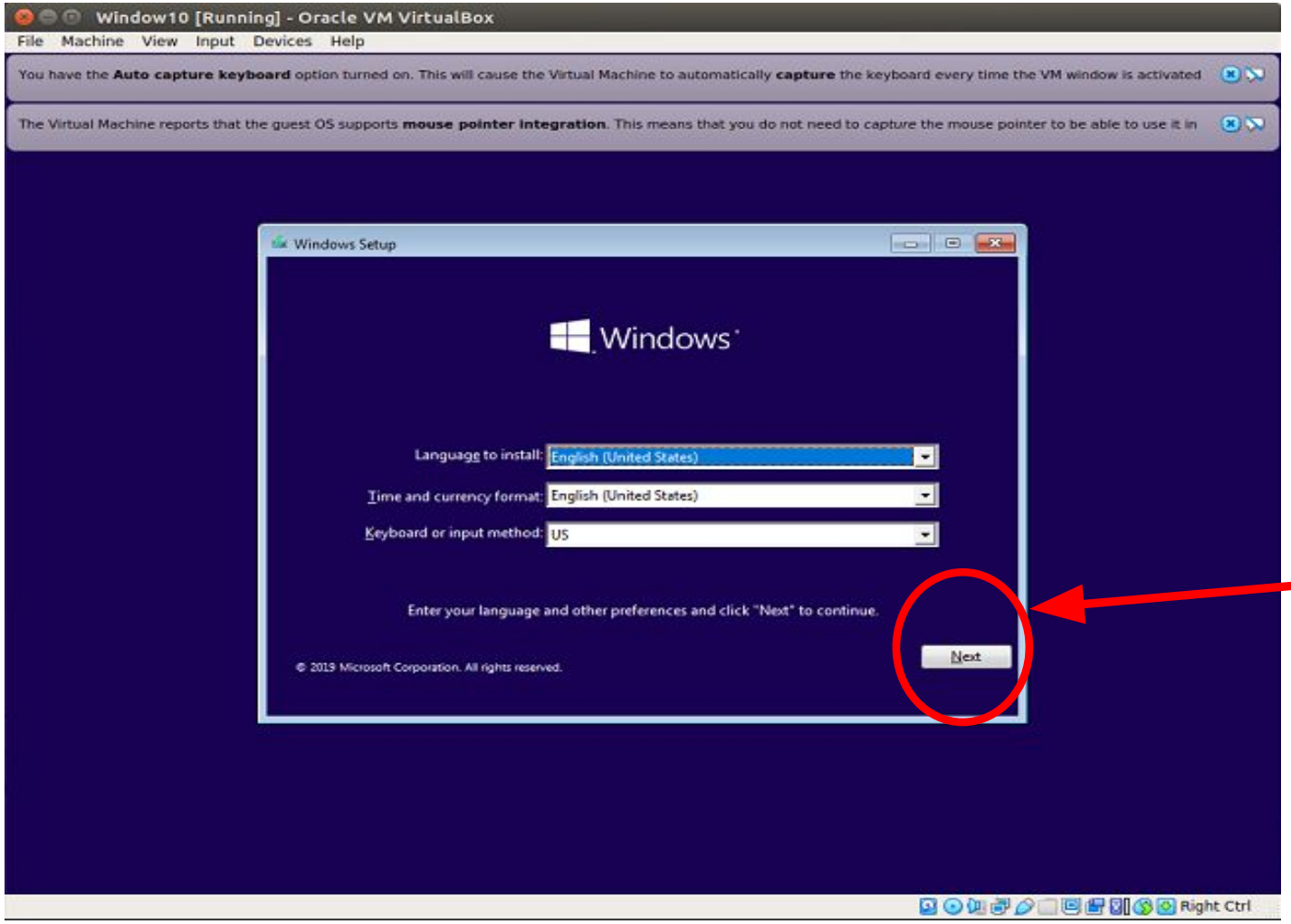
If it is not like this, change the order by clicking the arrow signs (up, down) right to the list.

Install Windows 10 in VM (6)



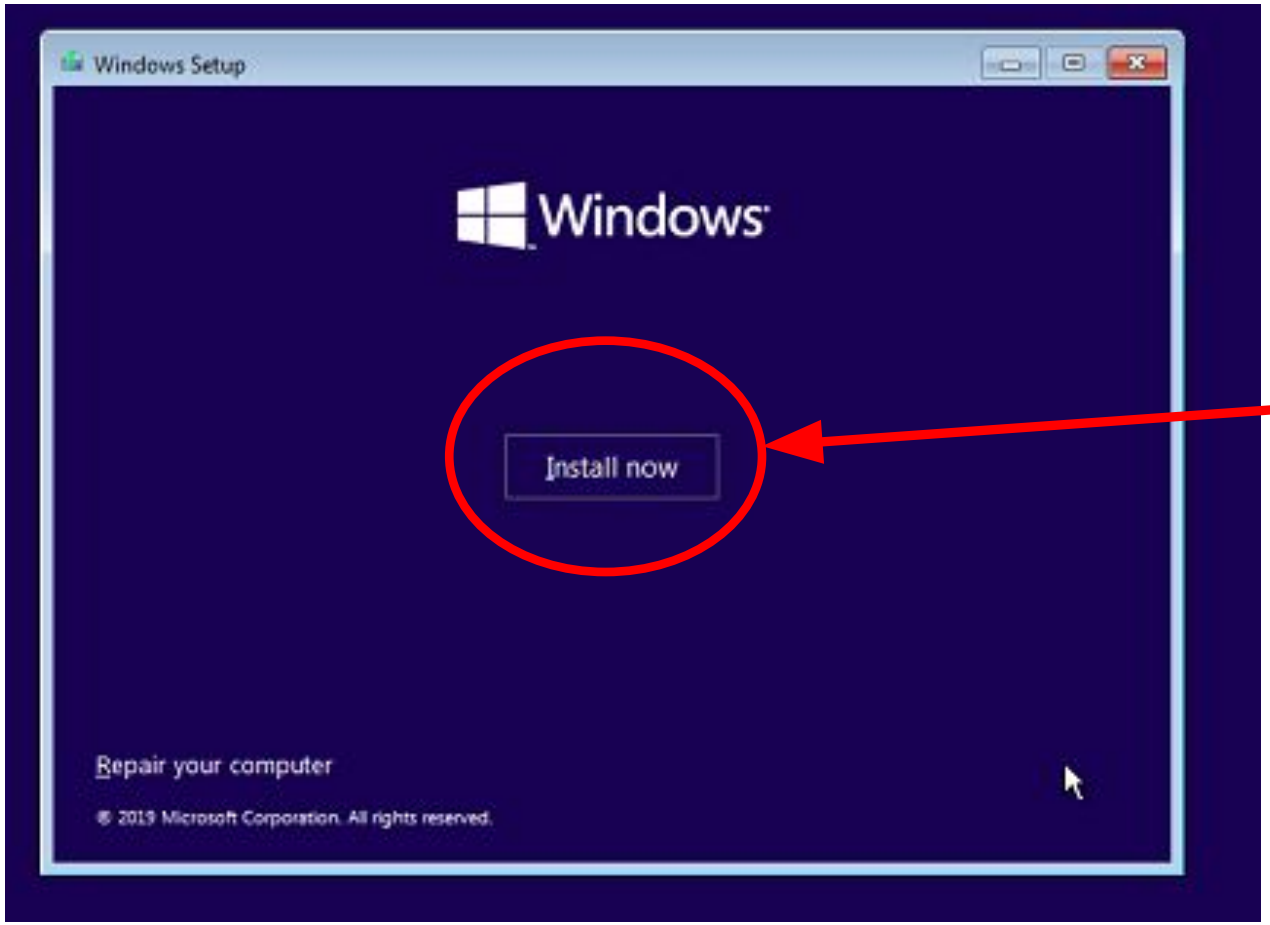
Start the Virtual machine

Install Windows 10 in VM (9)



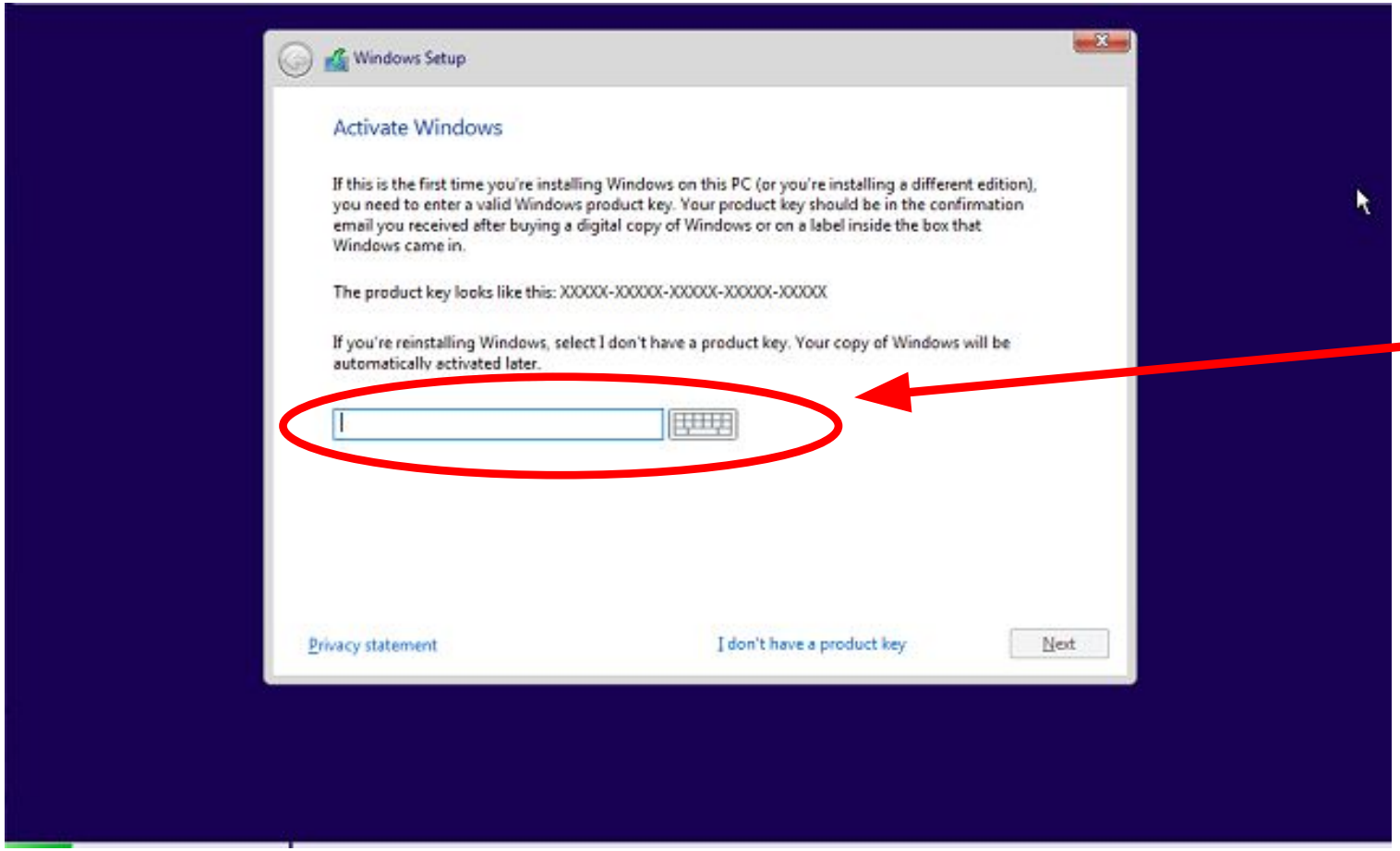
Click Next

Install Windows 10 in VM (10)



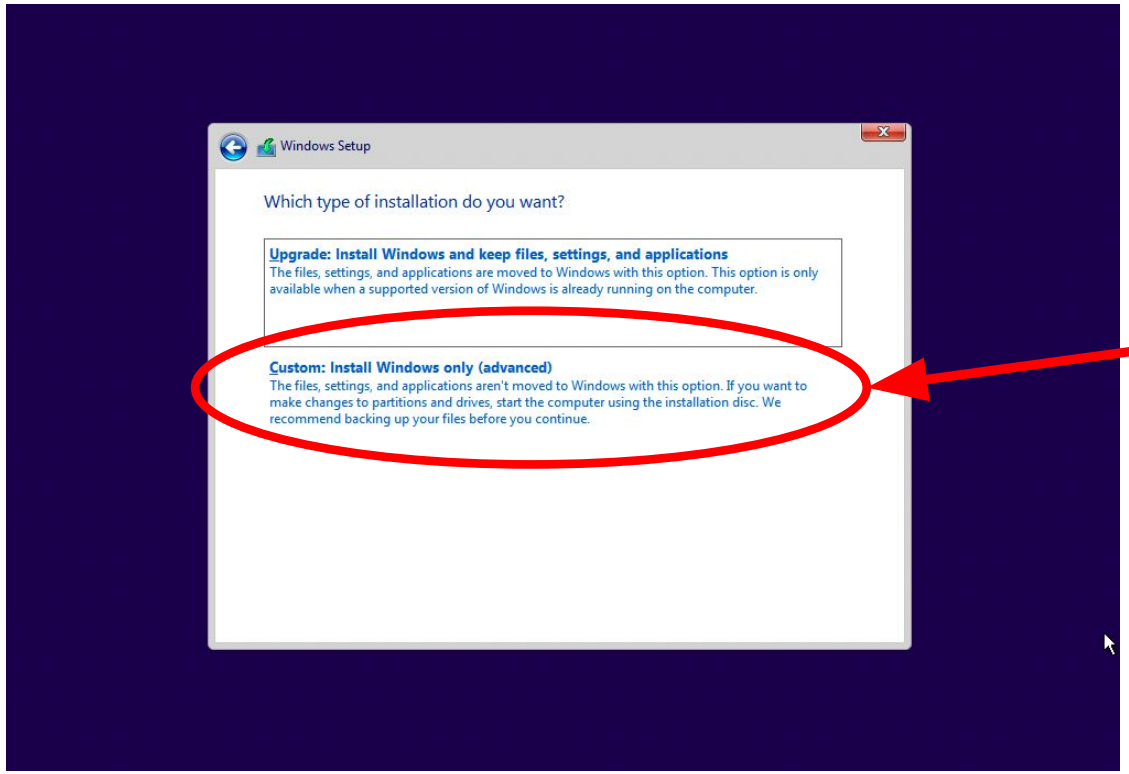
Click Install now

Install Windows 10 in VM (11)



Provide key that you stored in the text file

Install Windows 10 in VM (12)

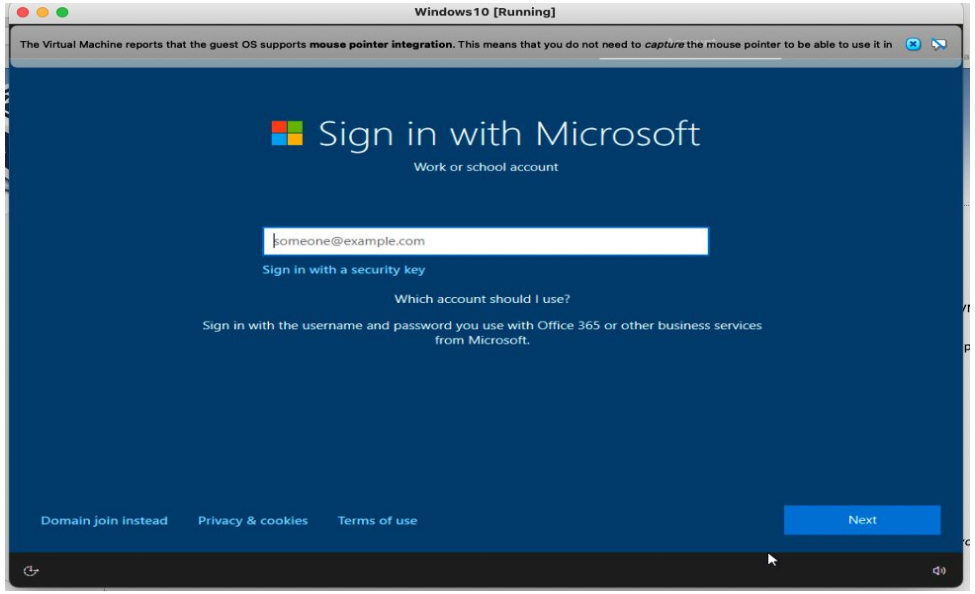


Select custom installation

Then click next to start installation

Install Windows 10 in VM (13)

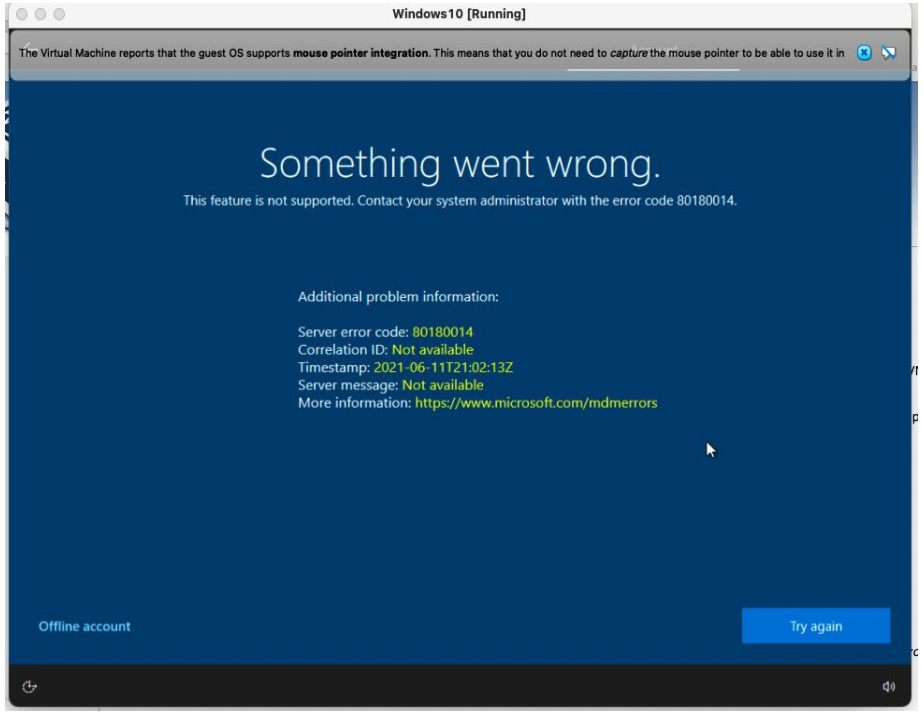
- After the installation system will reboot.



- Try to login using university credentials (school email and password)

Install Windows 10 in VM (14)

- If the following error screen appears create an offline account, using the offline account option on the lower left corner



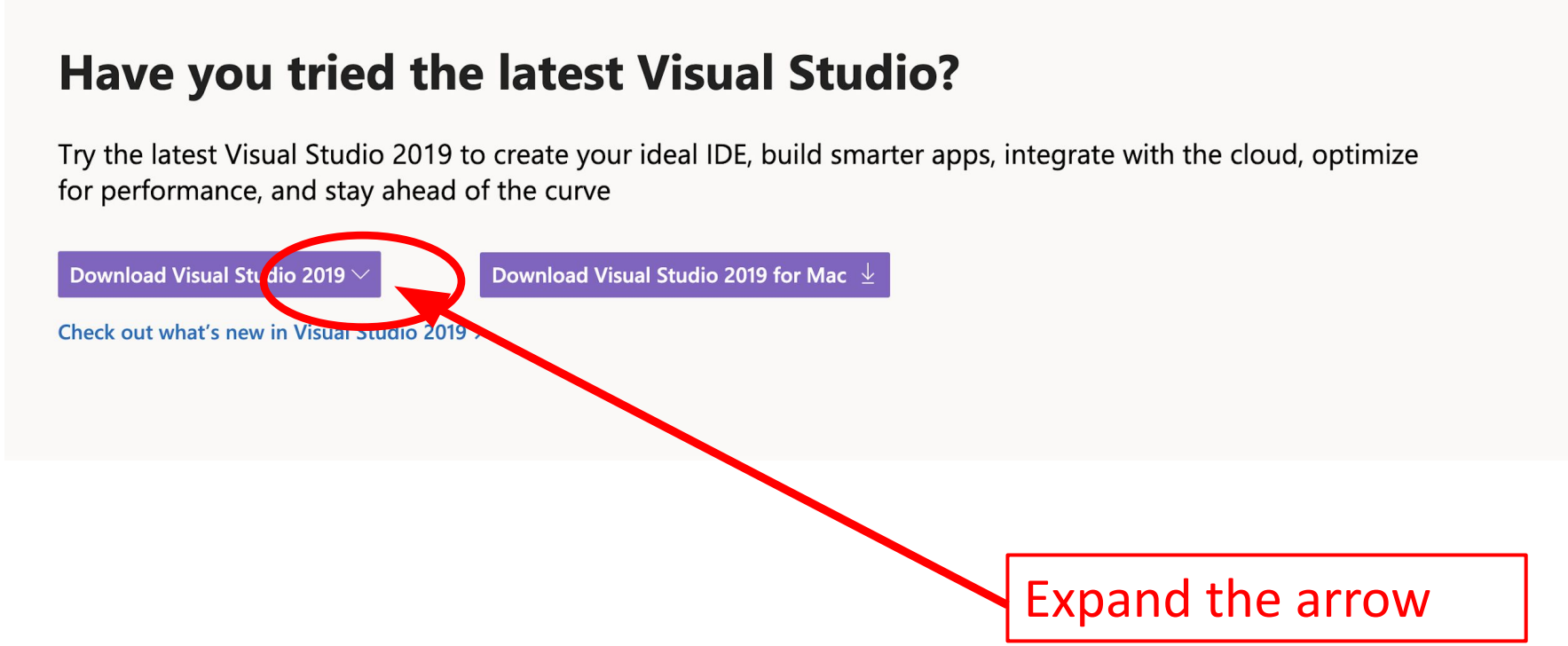
Install Microsoft Visual Studio

Both Windows and Mac OS users

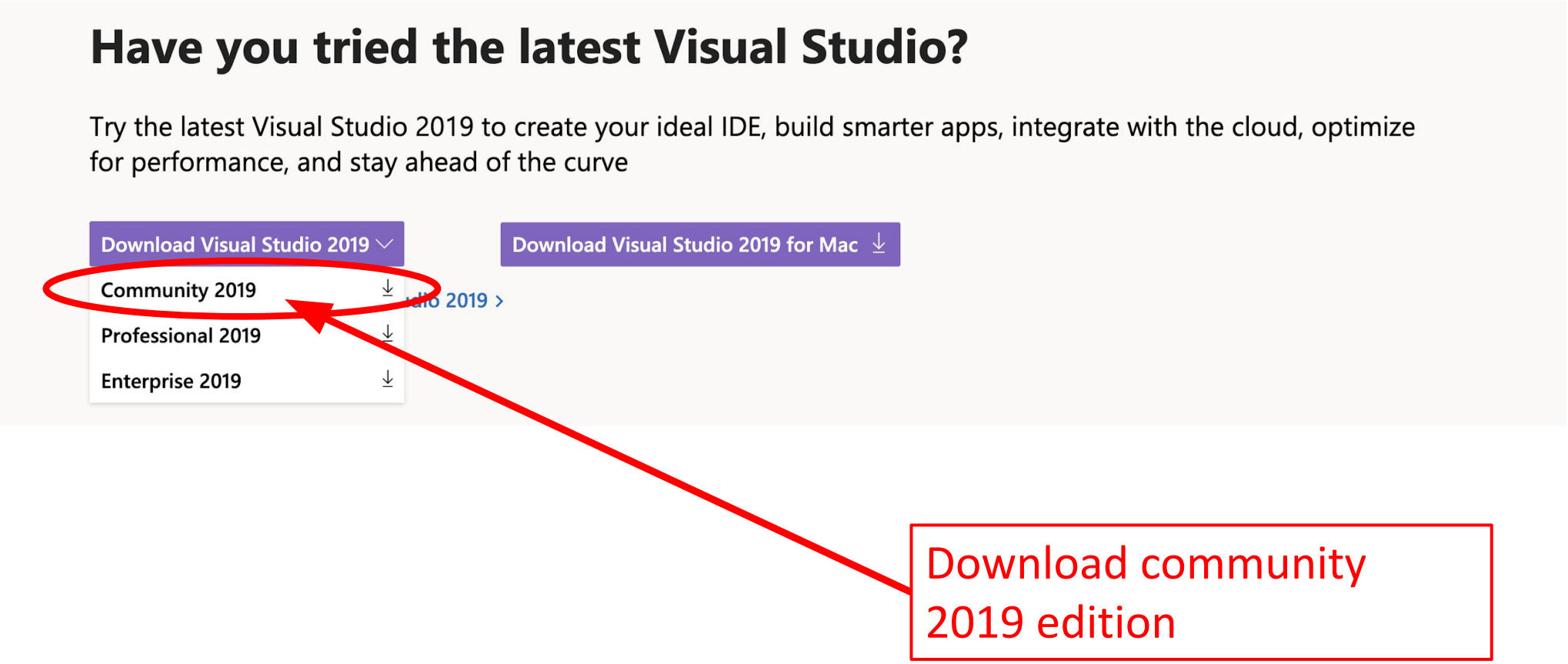
Mac users need to install Microsoft visual studio on the windows Virtual machine.

Visual Studio Setup

- Go to : https://visualstudio.microsoft.com/vs/older-downloads/

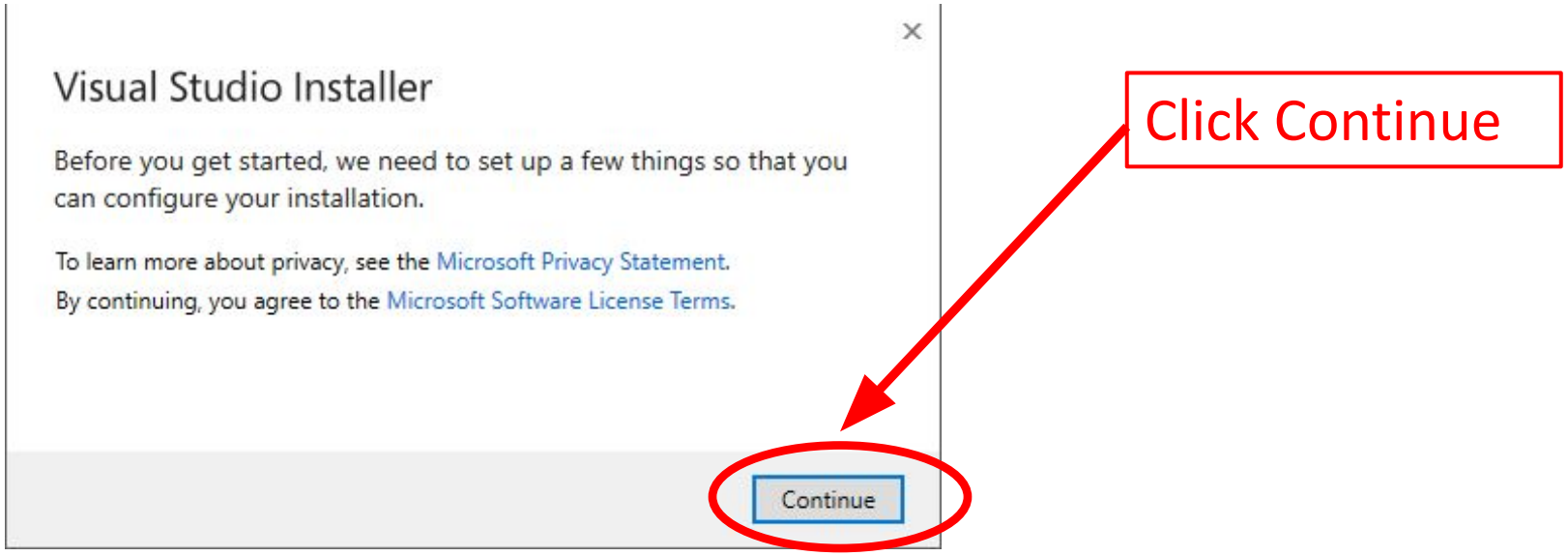


Visual Studio setup



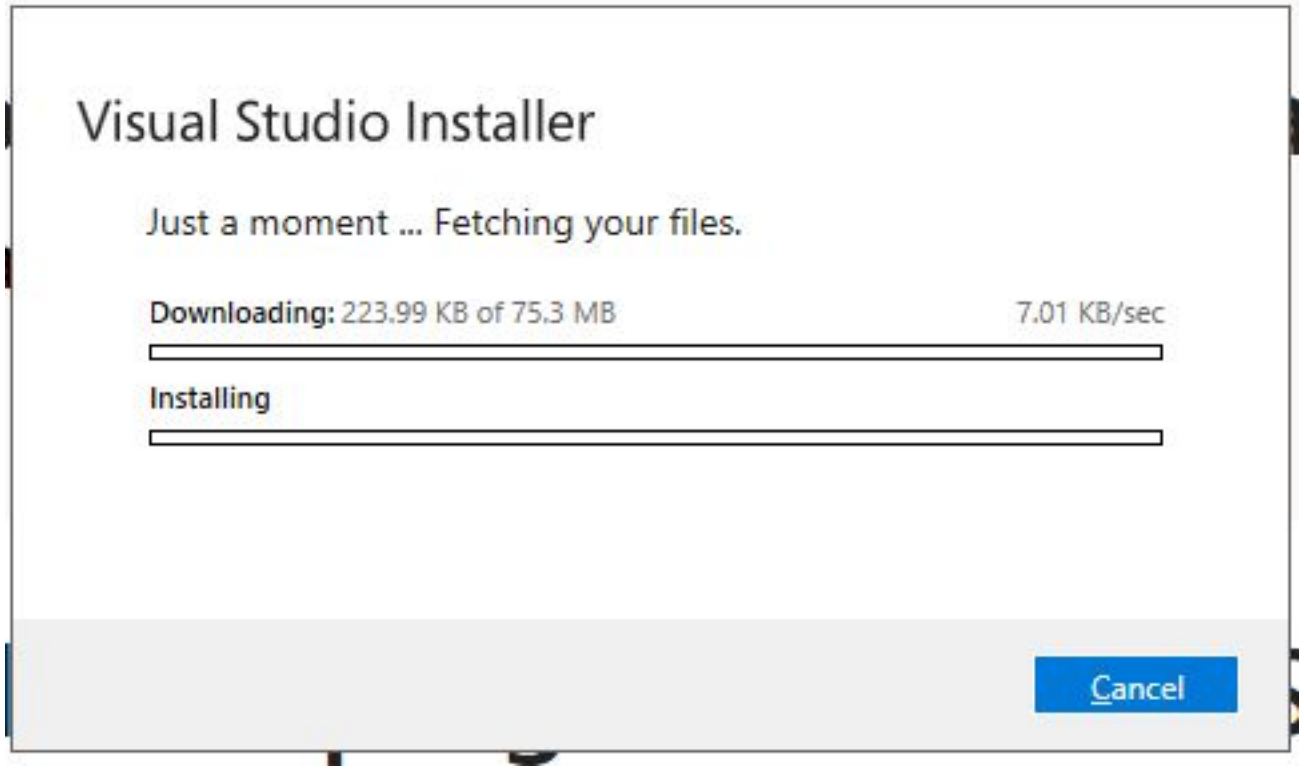
Visual Studio Setup

- Double Click the installer
- Click Continue button

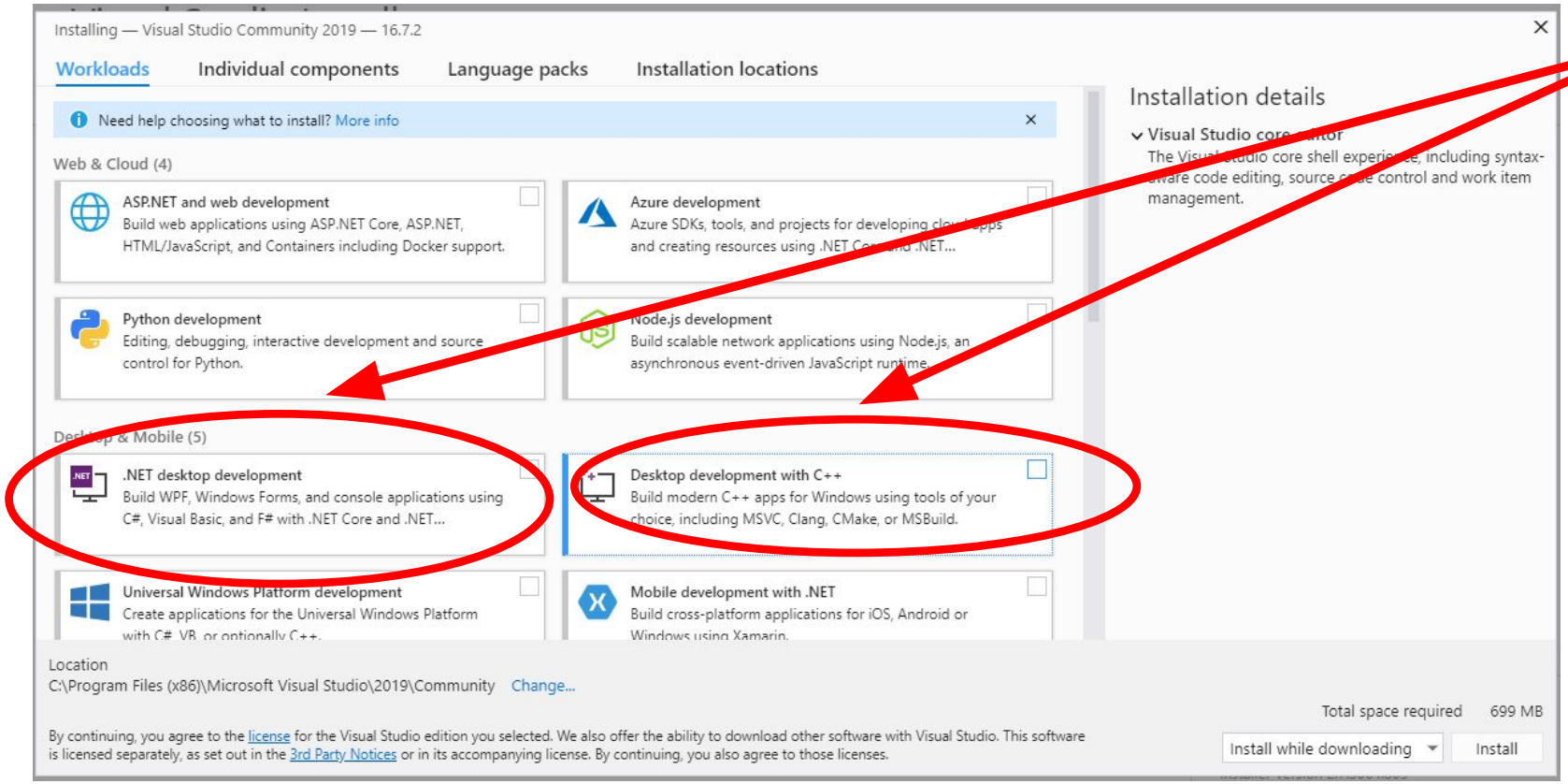


Visual Studio Setup

It will start downloading files

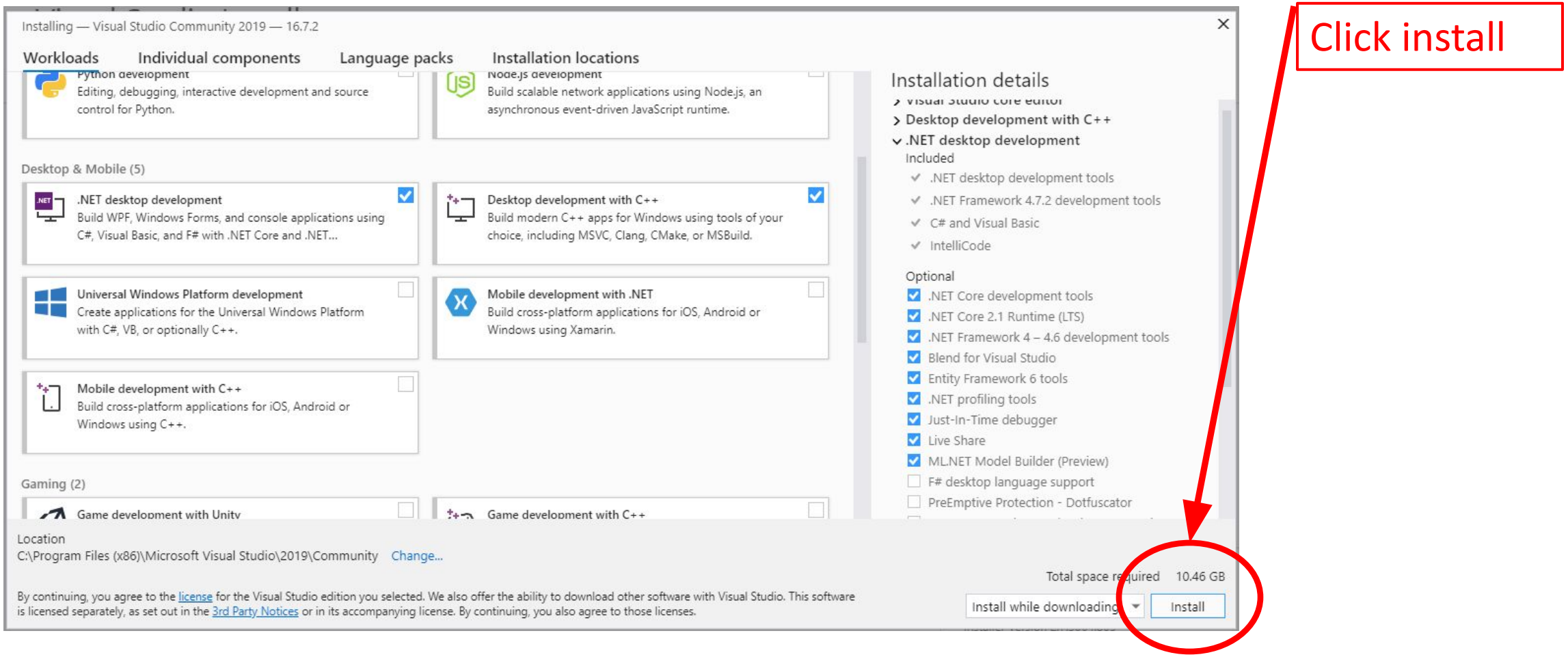


Visual Studio Setup



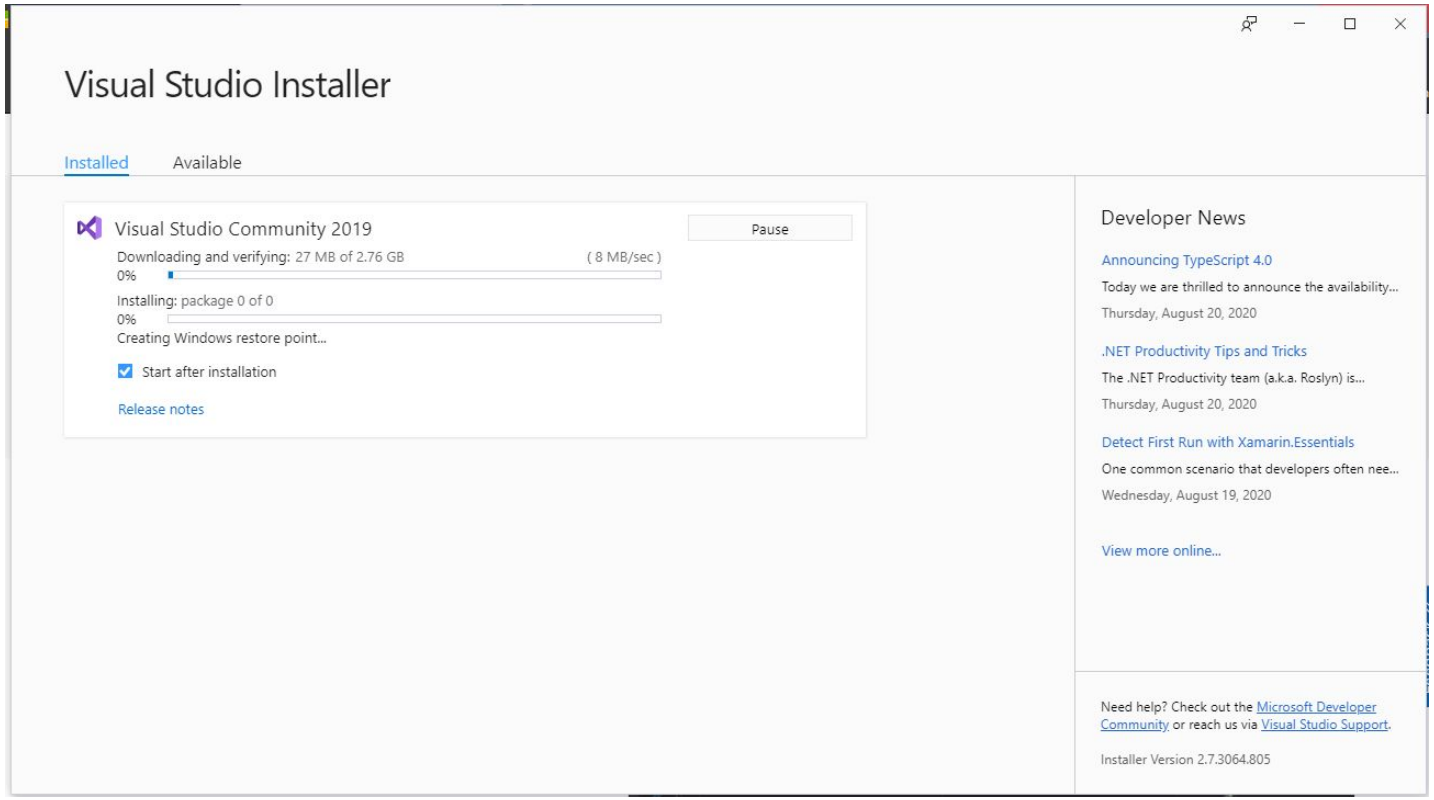
Check mark both .Net Desktop development and Desktop development with C++

Visual Studio Setup



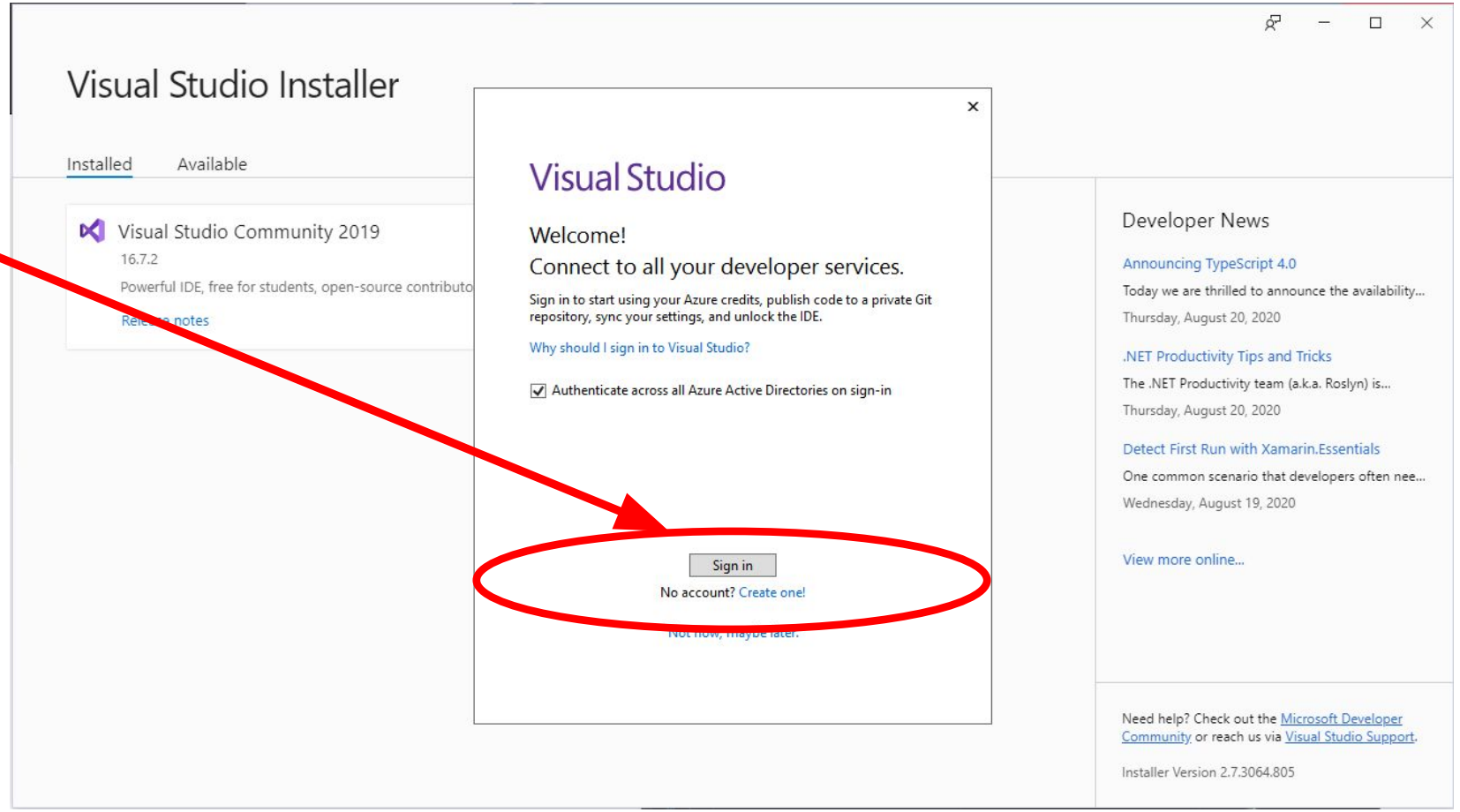
Visual Studio Setup

It will take some time to download the files, depending on your internet speed.

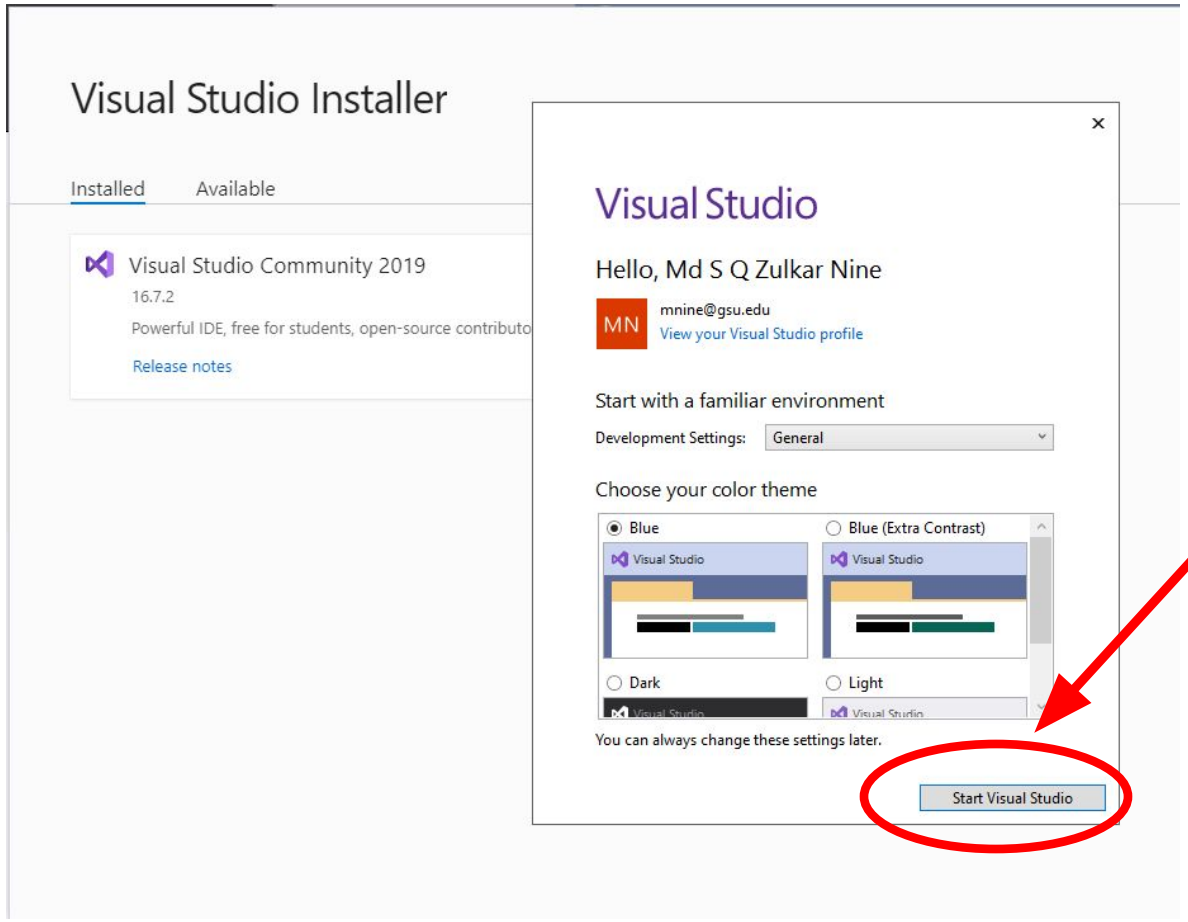


Visual Studio Setup

- Sign in with your Microsoft account
  - Username
  - Password



Visual Studio Setup



Start visual Studio

Some Math Recap …

Examples

- Example 1: Convert Binary to Hexadecimal
- Convert 10010010110101 to Hex

Solution:

1) Segment bits as a group of 4 bits from the right side.

10 0100 1011 0101

2) Pad with 0's when the left most group doesn't have 4 bits

0010	0100	1011	0101

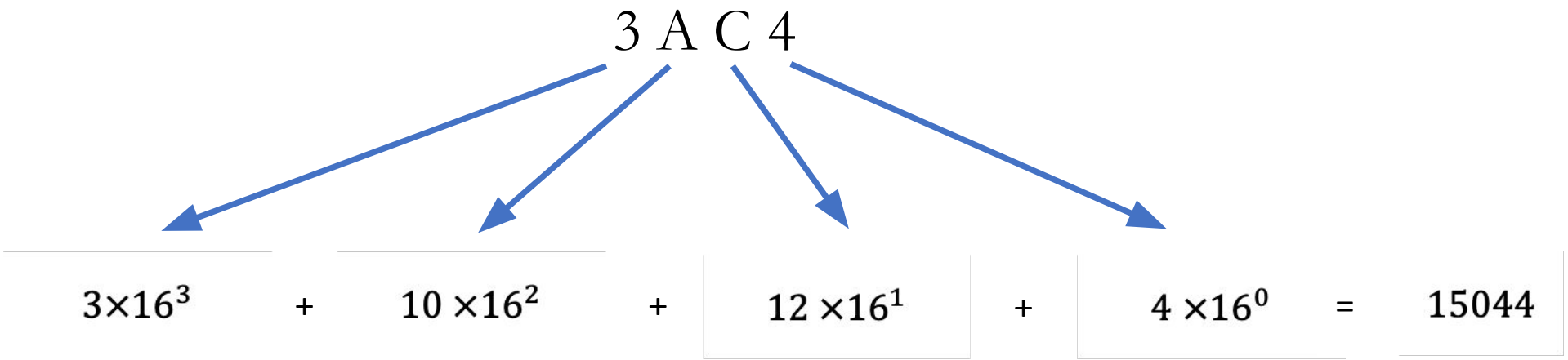
3) Convert each group into hexadecimal digits using the table : 24B5

Binary	Hex
0000	0
0001	1
0010	2
0011	3
0100	4
0101	5
0110	6
0111	7
1000	8
1001	9
1010	A
1011	B
1100	C
1101	D
1110	E
1111	F

Examples

- Example 2: Convert Hexadecimal to Decimal
- Convert 3AC4 to decimal

Solution:



Examples

- Example 3: Convert the following number into two's compliment form.
- Convert 00010110 into 2's Complement form

Solution:

1) Flip all the bits (0 to 1, 1 to 0)

11101001 (This is 1's complement)

2) Add 1 to the 1's complement

```
  11101001
+         1
----------
  11101010   (This is 2's complement)
```

Examples

- Example 4: Hexadecimal Addition
- 3AE8 + 9FBA = ?

carry 1 1 1

3 A E 8

2 F B A

6 A A 2

$8 + 10 = 18; \quad \frac{18}{16} = 1\,, rem\ 2$

$1 + 14 + 11 = 26; \quad \frac{26}{16} = 1\,, rem = 10$; 10 is A in Hex

$1 + 10 + 15 = 26; \quad \frac{26}{16} = 1\,, rem = 10$; 10 is A in Hex

$1 + 3 + 2 = 6;$ 6 is 6 in Hex

Examples

- Example 1: Convert Binary to Octal
- Convert 10100011101 to Octal

Solution:

1) Segment bits as a group of 3 bits from the right side.

10 0100 1011 0101

2) Pad with 0's when the left most group doesn't have 4 bits

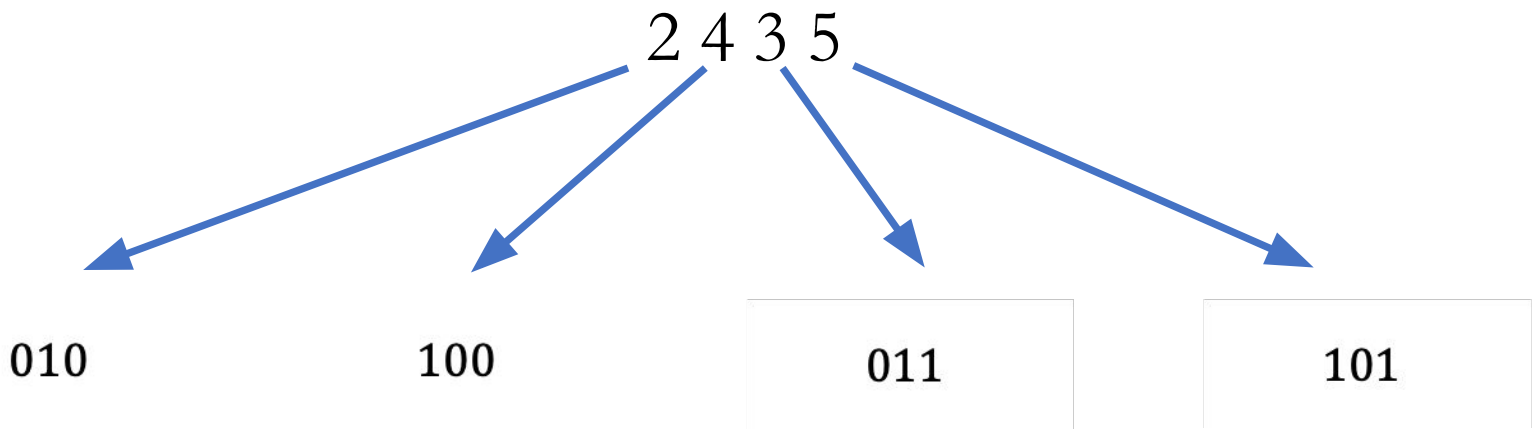
010	100	011	101

3) Convert each group into Octal digits using the table : 2 4 3 5

Binary	Octal
000	0
001	1
010	2
011	3
100	4
101	5
110	6
111	7

Example : Octal to Binary Conversion

- Convert 2435 to Binary



Binary	Octal
000	0
001	1
010	2
011	3
100	4
101	5
110	6
111	7

Octal addition

- Add two octal numbers :

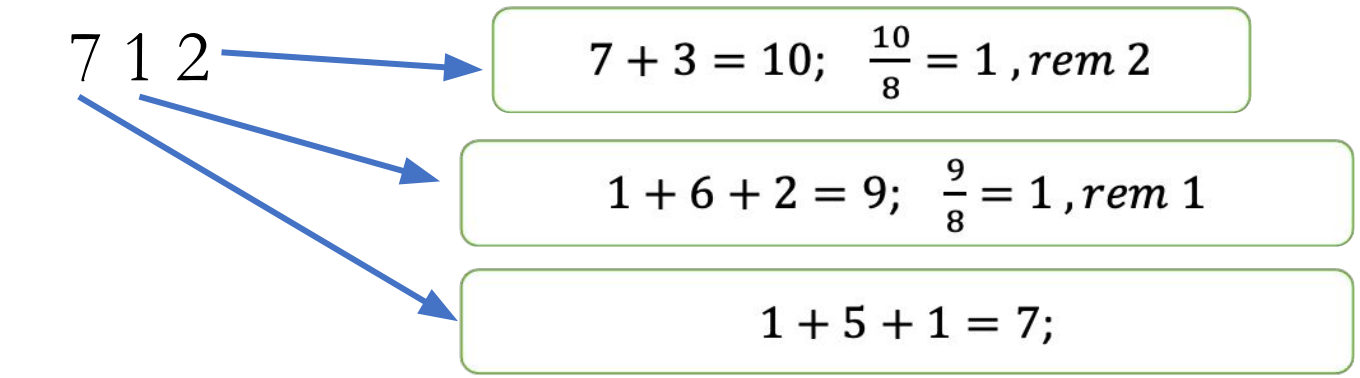
$$567 + 123 = ?$$

Carry. 1 1

5 6 7

1 2 3

7 1 2



Practice at home

- Number conversion among binary, hexadecimal, octal
- Addition, subtraction different number systems.

Lab 1 (b) : Basic Concepts

Submission instructions

Lab 1 (b) : Submission

- Solve the Problems provided in slide 57 to 59.
- You can do your work in a text editor (Microsoft word, open office, etc.)
- Or you can do it in a piece of paper, then scan or take a picture of the paper.
- Convert them into pdf and submit in the icollege.

Lab 1 (b): Problem 1

- Subtract the following hexadecimal numbers

  7ACD - 3A8C = ?

Show the computation in details with all the carries. Result should be Hexadecimal

Lab 1 (b) Problem 2

- Convert 01110110 into 2's Complement form.

Lab 1 (b) Problem 3

- Subtract the following Octal numbers

765 – 371

Show the steps with carries. Result is a octal number