

CSC 3210

Computer Organization and Programming

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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

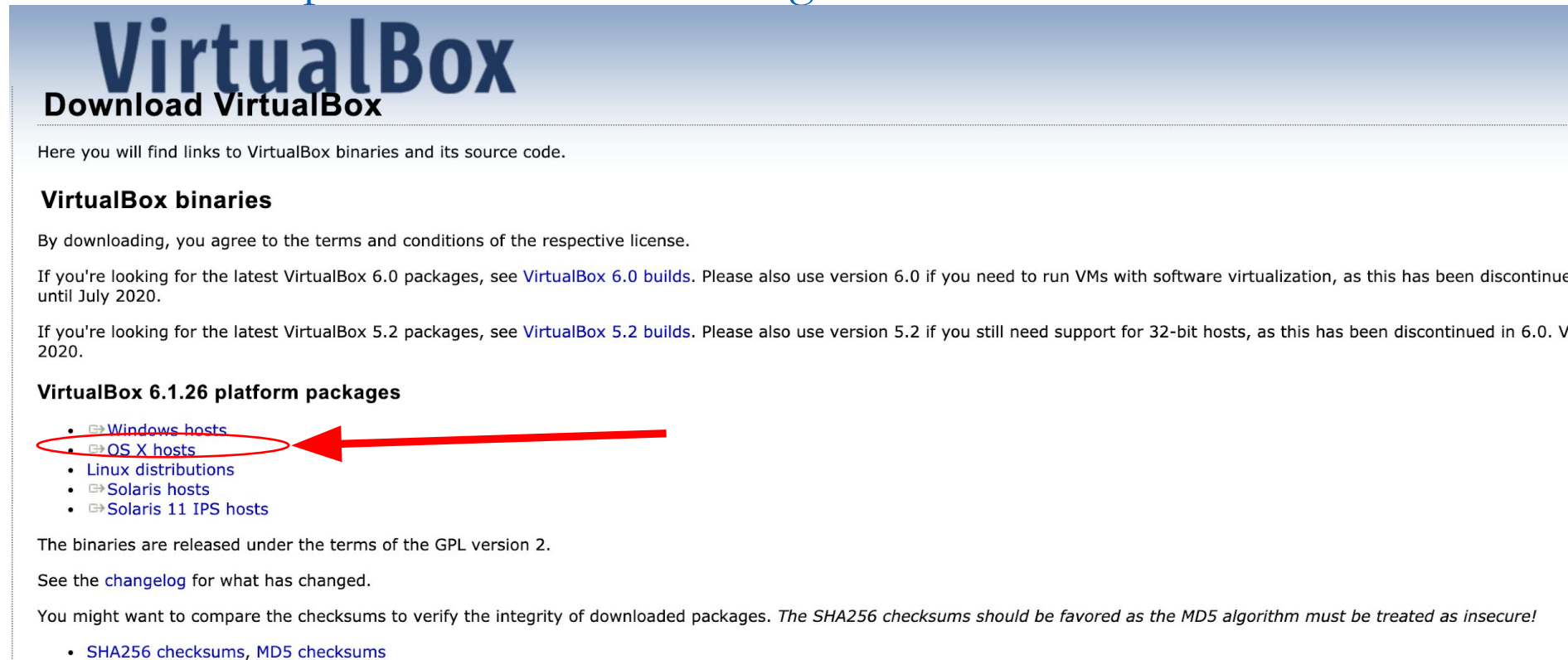
(You need at least 50GB free hard disk space, 60GB is recommended)

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>



The screenshot shows the 'VirtualBox Download VirtualBox' page. It features a blue header with the 'VirtualBox' logo. Below the header, there is a section titled 'Download VirtualBox' with a subtitle 'Here you will find links to VirtualBox binaries and its source code.' The main content area includes a section for 'VirtualBox binaries' with a disclaimer about license terms. It then provides links for the latest VirtualBox 6.0 and 5.2 packages. A section titled 'VirtualBox 6.1.26 platform packages' lists several operating system hosts: Windows, OS X, Linux, Solaris, and Solaris 11 IPS. The 'OS X hosts' link is circled in red, and a large red arrow points to it from the right. Below this list, there is a note about the GPL version 2 license, a link to the changelog, and a warning about checksums. The page concludes with a list of links for SHA256 and MD5 checksums.

VirtualBox
Download VirtualBox

Here you will find links to VirtualBox binaries and its source code.

VirtualBox binaries

By downloading, you agree to the terms and conditions of the respective license.

If you're looking for the latest VirtualBox 6.0 packages, see [VirtualBox 6.0 builds](#). Please also use version 6.0 if you need to run VMs with software virtualization, as this has been discontinued until July 2020.

If you're looking for the latest VirtualBox 5.2 packages, see [VirtualBox 5.2 builds](#). Please also use version 5.2 if you still need support for 32-bit hosts, as this has been discontinued in 6.0. V 2020.

VirtualBox 6.1.26 platform packages

- [Windows hosts](#)
- [OS X hosts](#)
- [Linux distributions](#)
- [Solaris hosts](#)
- [Solaris 11 IPS hosts](#)

The binaries are released under the terms of the GPL version 2.

See the [changelog](#) for what has changed.

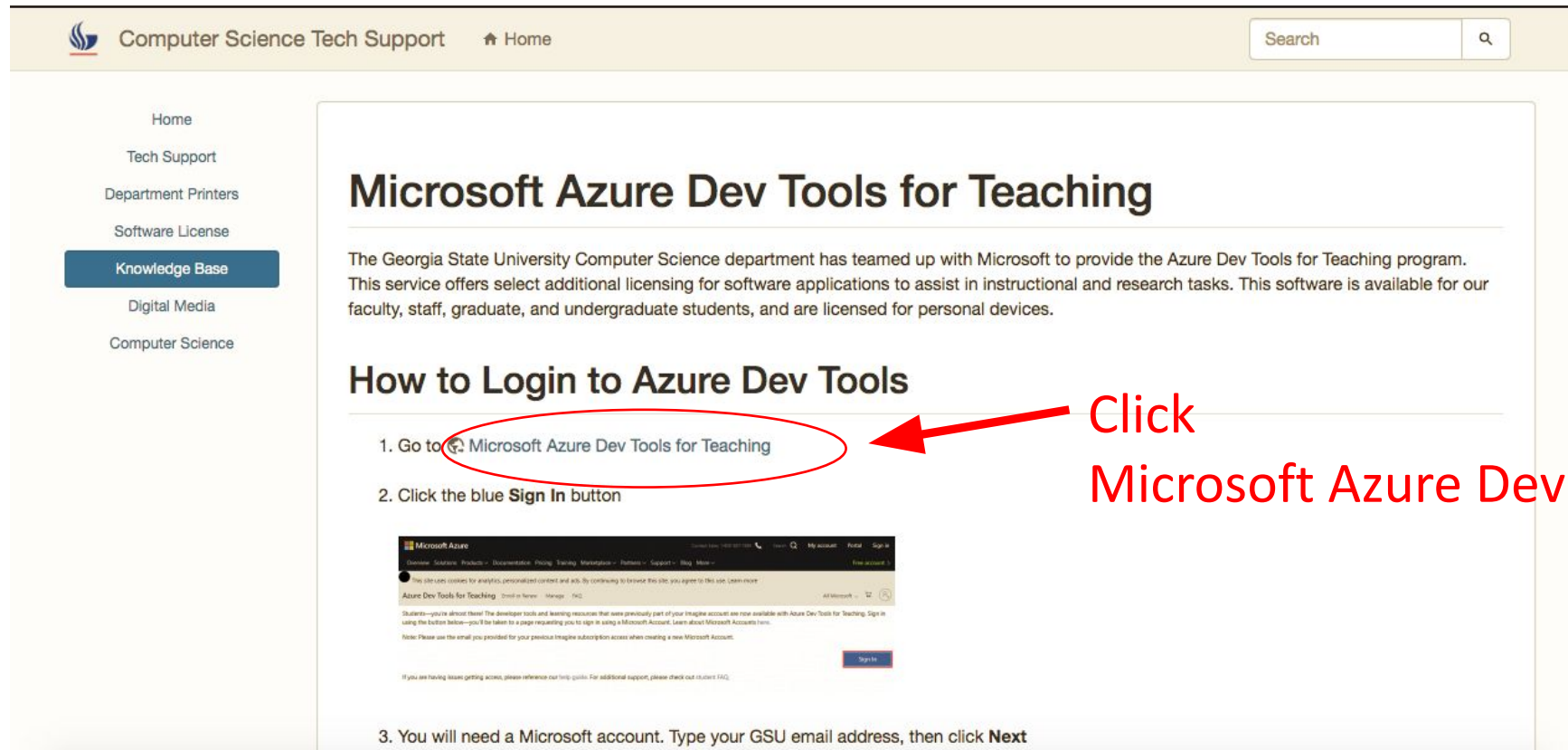
You might want to compare the checksums to verify the integrity of downloaded packages. *The SHA256 checksums should be favored as the MD5 algorithm must be treated as insecure!*

- [SHA256 checksums](#), [MD5 checksums](#)

- Install the software

Download Windows 10 ISO (1)

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



The screenshot shows the 'Computer Science Tech Support' website. The left sidebar contains links: Home, Tech Support, Department Printers, Software License, Knowledge Base (highlighted), Digital Media, and Computer Science. The main content area is titled 'Microsoft Azure Dev Tools for Teaching'. Below the title, a paragraph explains the program. A section titled 'How to Login to Azure Dev Tools' contains two steps. Step 1, 'Go to Microsoft Azure Dev Tools for Teaching', is circled in red with a red arrow pointing to it from the text 'Click Microsoft Azure Dev tools for Teaching'. Step 2 is 'Click the blue Sign In button'. Below the steps is a screenshot of the Microsoft Azure portal showing the 'Azure Dev Tools for Teaching' page with a 'Sign In' button. Step 3, 'You will need a Microsoft account. Type your GSU email address, then click Next', is partially visible at the bottom.

Computer Science Tech Support Home

Home
Tech Support
Department Printers
Software License
Knowledge Base
Digital Media
Computer Science

Microsoft Azure Dev Tools for Teaching

The Georgia State University Computer Science department has teamed up with Microsoft to provide the Azure Dev Tools for Teaching program. This service offers select additional licensing for software applications to assist in instructional and research tasks. This software is available for our faculty, staff, graduate, and undergraduate students, and are licensed for personal devices.

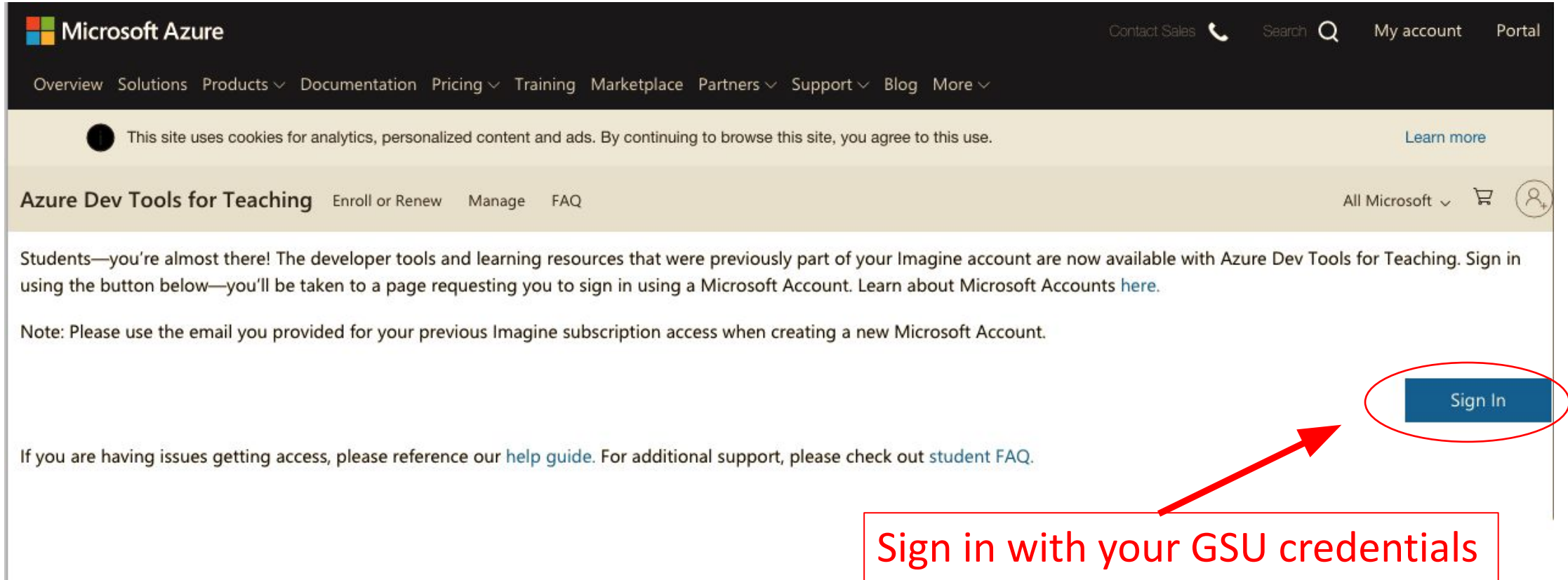
How to Login to Azure Dev Tools

1. Go to [Microsoft Azure Dev Tools for Teaching](#)
2. Click the blue **Sign In** button

Click Microsoft Azure Dev tools for Teaching

3. You will need a Microsoft account. Type your GSU email address, then click Next

Download Windows 10 ISO (2)



The screenshot shows the Microsoft Azure website header with the logo and navigation links. Below the header is a cookie consent banner. The main content area is titled 'Azure Dev Tools for Teaching' and includes links for 'Enroll or Renew', 'Manage', and 'FAQ'. A message informs students that developer tools and learning resources are now available with Azure Dev Tools for Teaching, signed in using a Microsoft Account. A note specifies to use the email from the previous Imagine subscription. A blue 'Sign In' button is highlighted with a red circle and a red arrow pointing to it from a red box containing the text 'Sign in with your GSU credentials'.

Microsoft Azure

Contact Sales Search My account Portal

Overview Solutions Products Documentation Pricing Training Marketplace Partners Support Blog More

This site uses cookies for analytics, personalized content and ads. By continuing to browse this site, you agree to this use. [Learn more](#)

Azure Dev Tools for Teaching Enroll or Renew Manage FAQ All Microsoft

Students—you're almost there! The developer tools and learning resources that were previously part of your Imagine account are now available with Azure Dev Tools for Teaching. Sign in using the button below—you'll be taken to a page requesting you to sign in using a Microsoft Account. [Learn about Microsoft Accounts here.](#)

Note: Please use the email you provided for your previous Imagine subscription access when creating a new Microsoft Account.

If you are having issues getting access, please reference our [help guide](#). For additional support, please check out [student FAQ](#).

Sign In

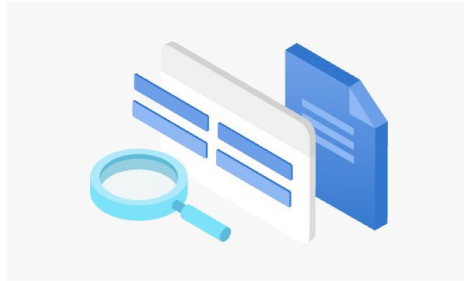
Sign in with your GSU credentials

Download Windows 10 ISO (3)

Welcome to the Azure Education Hub!

Click on Download Software

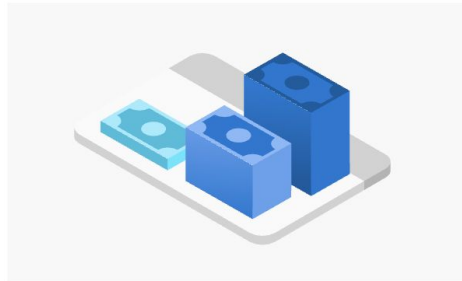
Whether you're a student getting started, an educator teaching advanced workloads, or just interest in building your cloud skills, we've got the development resources you need



Explore Azure roles

Explore Azure roles to start building the key cloud skills you'll need to be successful in leading technology careers.

Launch your career

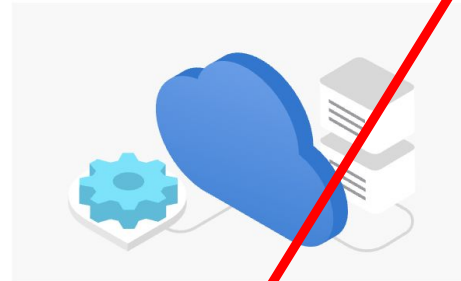


Redeem student credits

Start building the future with Azure for Students! Get \$100 in Azure credit when you activate your Azure for Students offer.

[Learn more](#)

Activate offer



Download free software

Gain access to full versions of professional developer tools for free to help you build code and deploy on your Azure subscription.

Download software

Download Windows 10 ISO (4)

Home > Education

Education | Software

Overview

Get started

Learning resources

Roles

Software

Learning

My account

Profile

Need help?

Support

windows 10

Product category : All

Operating System : All

System type : 64 bit,Service

Product language : English,Multilanguage

14 Items

| Name ↑↓ | Product category ↑↓ | Operating System ↑↓ | System type ↑↓ | Language ↑↓ |
|--|---------------------|---------------------|----------------|---------------|
| Windows 10 Education, version 20H2 (updated Nov 2020) - DVD | Operating System | Windows | 64 bit | English |
| Windows 10 Education N, version 20H2 (updated Nov 2020) - DVD | Operating System | Windows | 64 bit | English |
| Windows 10 Education, version 21H1 – DVD | Operating System | Windows | 64 bit | English |
| Windows 10 Education N, version 21H1 – DVD | Operating System | Windows | 64 bit | English |
| Windows 10, version 2004 or 20H2 4C Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 5C Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 9B Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 9C Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 1C Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 2C Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 Language Packs (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 10C Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 11C Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |
| Windows 10, version 2004 or 20H2 4B Local Experience Packs (LXPs) (released May 2020) | Operating System | Windows | 64 bit | Multilanguage |

(1) Search for "Windows 10"

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

Download Windows 10 ISO (5)

The screenshot shows the Windows 10 download page. At the top, there's a search bar with 'windows 10' and filters for 'Product category: All', 'Operating System: All', 'System type: 64 bit, Service', and 'Product language: English'. Below this is a table of 14 items. The third item, 'Windows 10 Education, version 21H1 – DVD', is highlighted. To the right of the table, a detailed view of this product is shown, including its description, operating system, and product language. A red box with an arrow points to the 'View Key' button, with the text '(1) Click on View Key and save the product key in notepad or anywhere'. Another red box with an arrow points to the 'Download' button, with the text '(2) Start the download'. A warning message at the bottom right states: 'This product may not be compatible with your current operating system'.

| Name ↑↓ | Product category ↑↓ | Operating System ↑↓ | System type ↑↓ |
|---|---------------------|---------------------|----------------|
| Windows 10 Education, version 20H2 (updated ... | Operating System | Windows | 64 bit |
| Windows 10 Education N, version 20H2 (updat... | Operating System | Windows | 64 bit |
| Windows 10 Education, version 21H1 – DVD | Operating System | Windows | 64 bit |
| Windows 10 Education N, version 21H1 – DVD | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 4C Local Ex... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 5C Local Ex... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 9B Local Ex... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 9C Local Ex... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 1C Local Ex... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 2C Local Ex... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 Language P... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 10C Local E... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 11C Local E... | Operating System | Windows | 64 bit |
| Windows 10, version 2004 or 20H2 4B Local Ex... | Operating System | Windows | 64 bit |

Windows 10 Education, version 21H1 – DVD
Windows 10 Education builds on Windows 10 Enterprise and provides enterprise-grade manageability and security for schools. Windows 10 Education is effectively a variant of Windows 10 Enterprise that provides education-specific default settings.

Operating System
Windows

Product language
English

System
64 bit

[View Key](#)

(1) Click on View Key and save the product key in notepad or anywhere

(2) Start the download

[Download](#) [Cancel](#)

⚠ This product may not be compatible with your current operating system

Create a virtual machine (1)

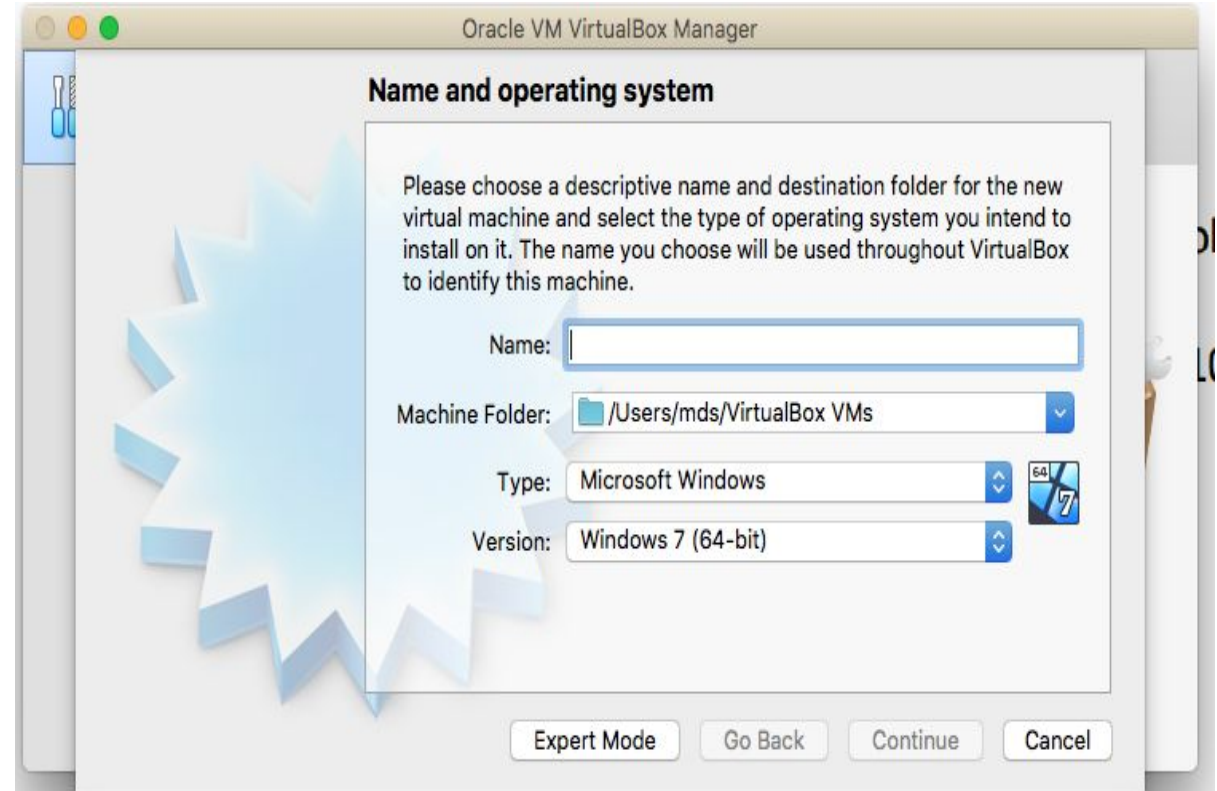
- Open the Virtual box



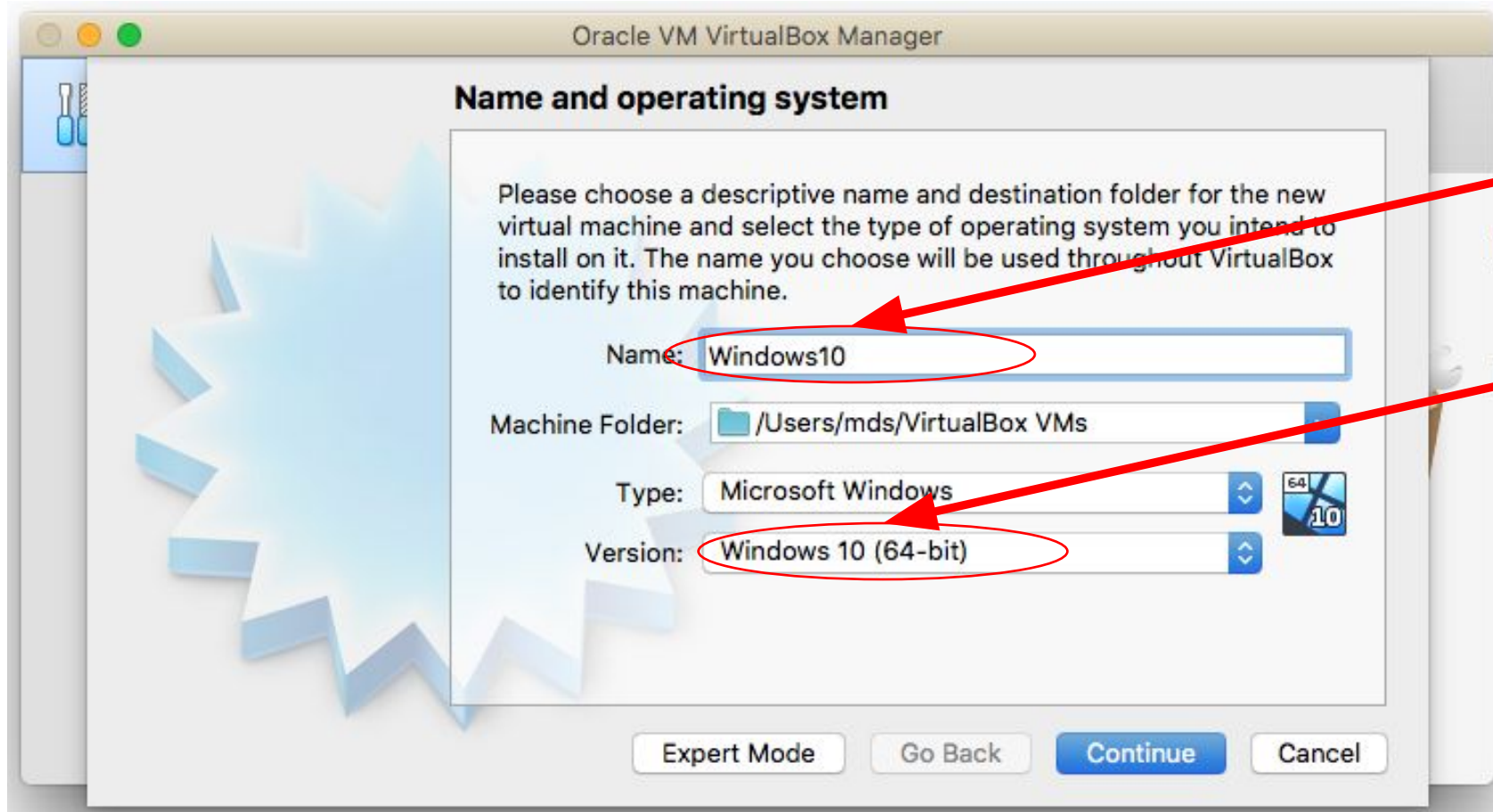
Create a new Virtual Machine

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.



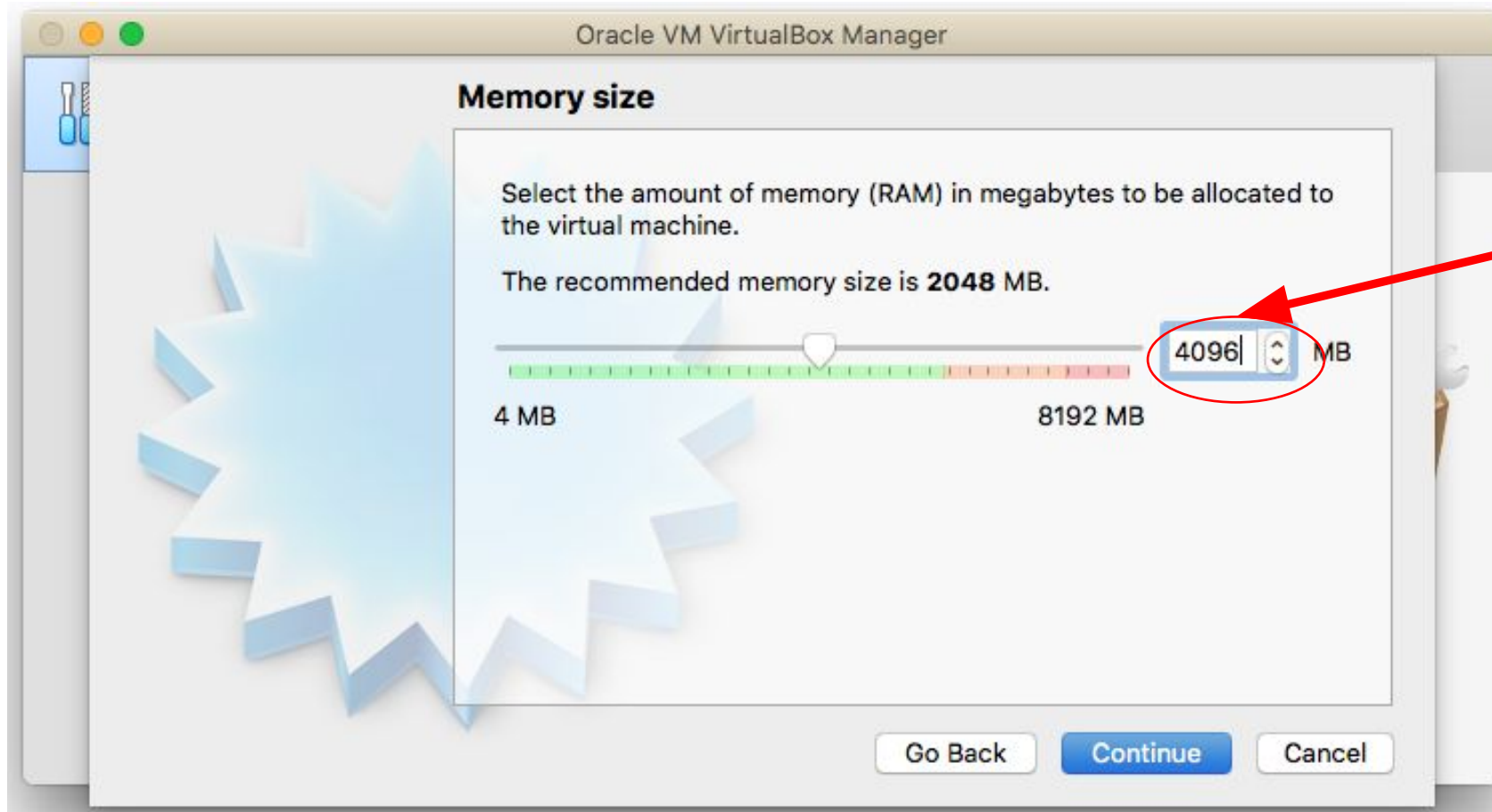
Create a virtual machine (3)



Name your VM

Make sure it is
Windows 10

Create a virtual machine (4)



Select memory
size
(4GB or more)

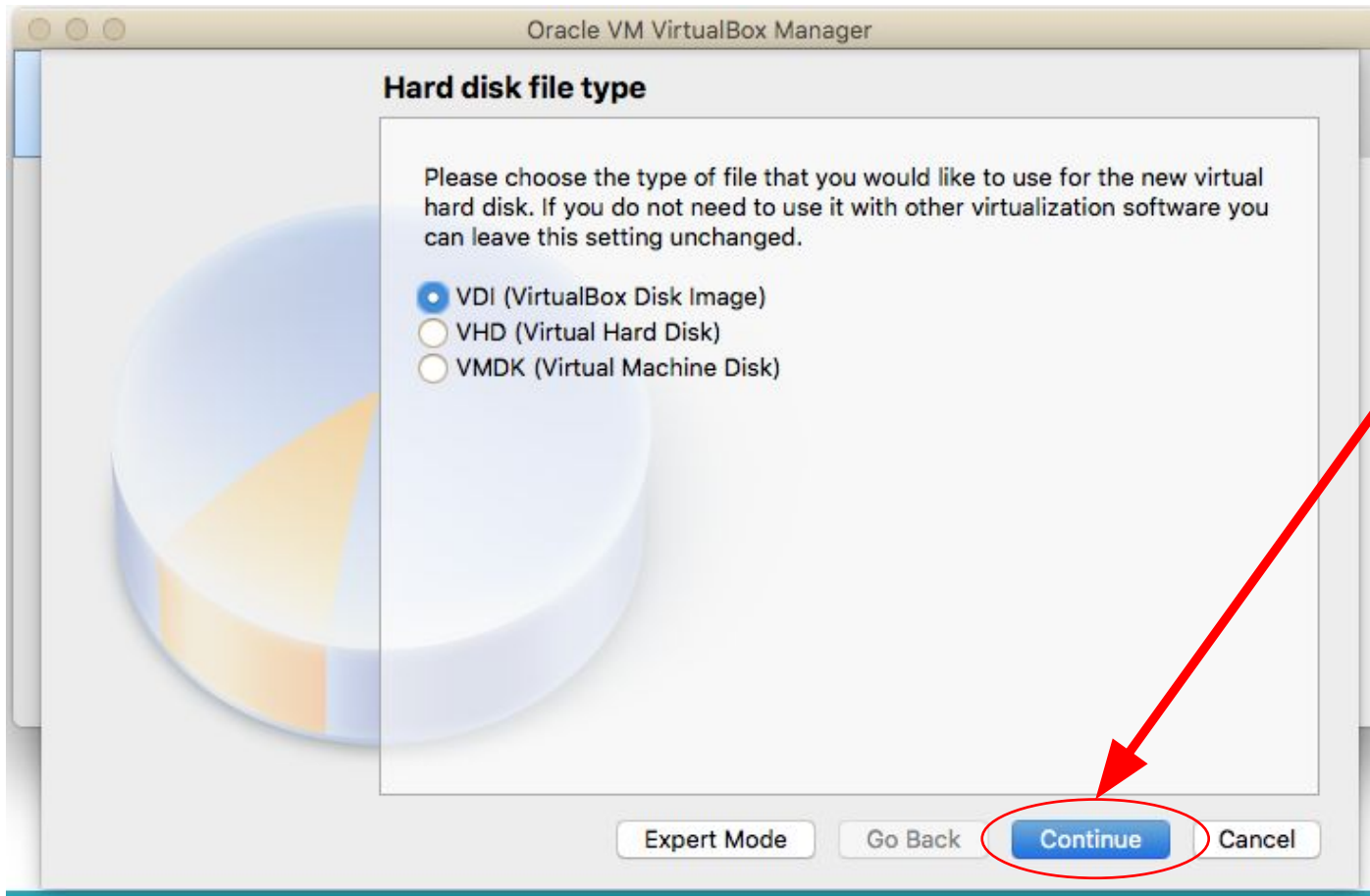
Create a virtual machine (5)



(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)



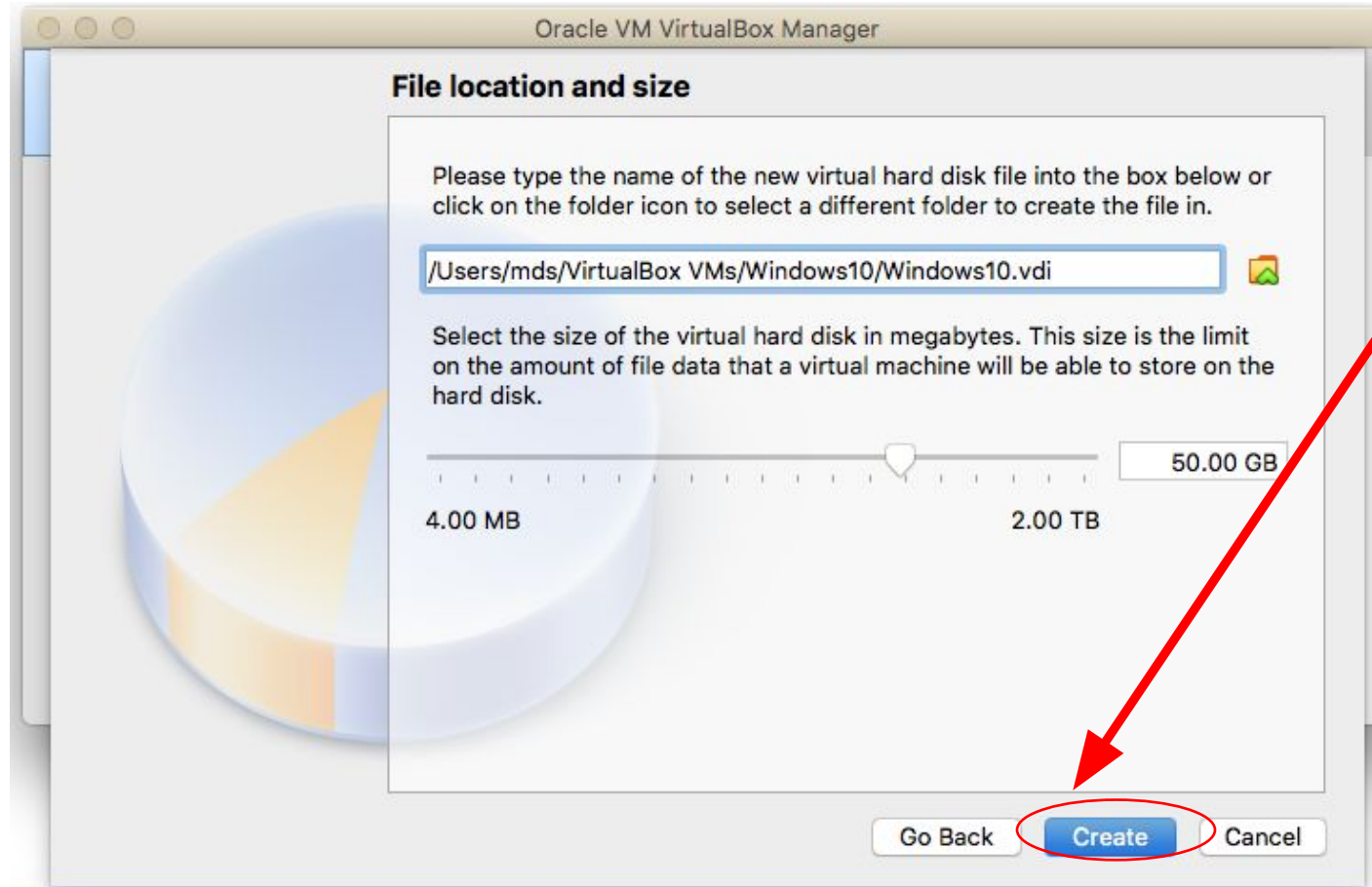
Click Continue

Create a virtual machine (7)



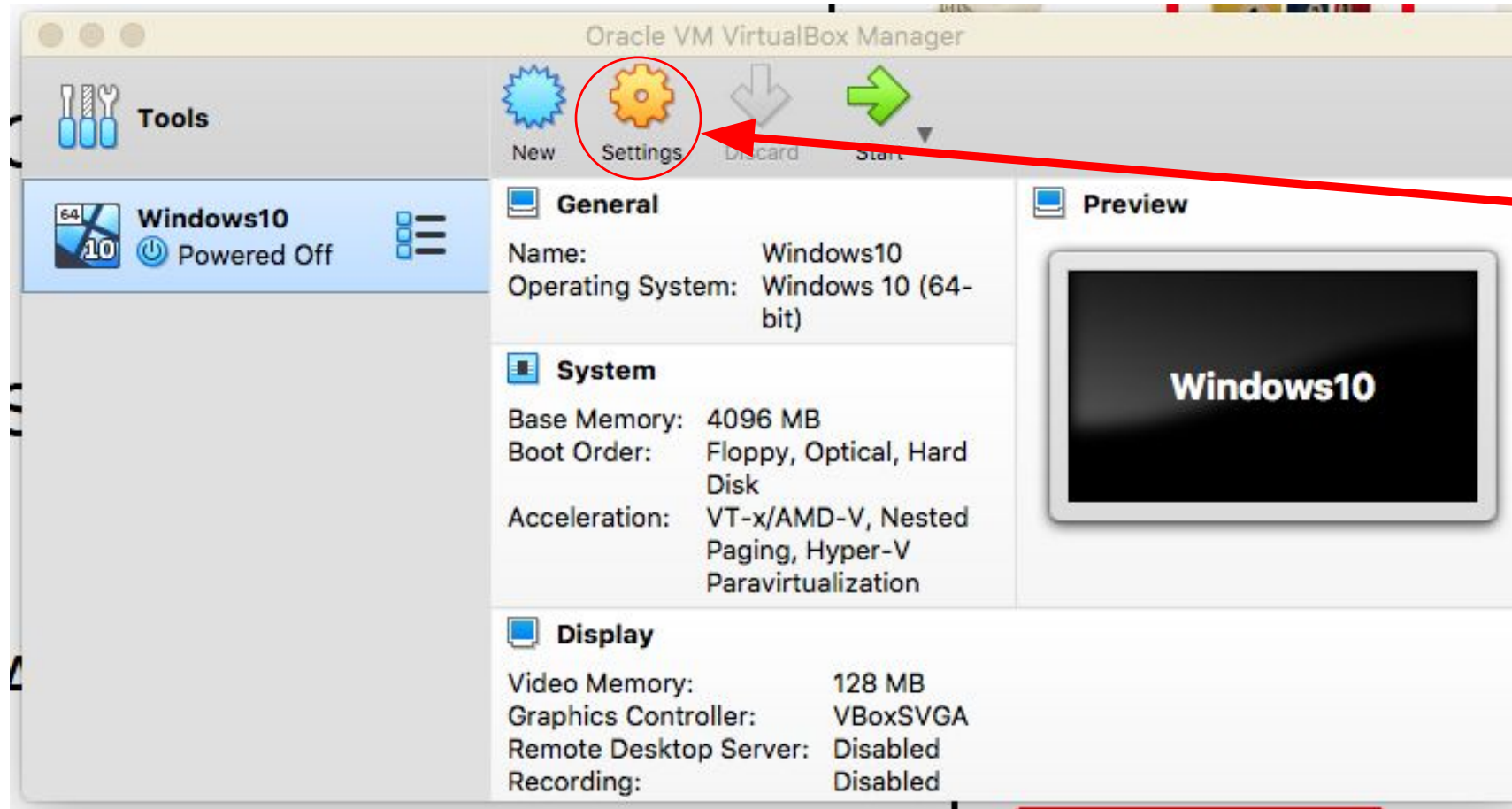
Click Continue

Create a virtual machine (8)



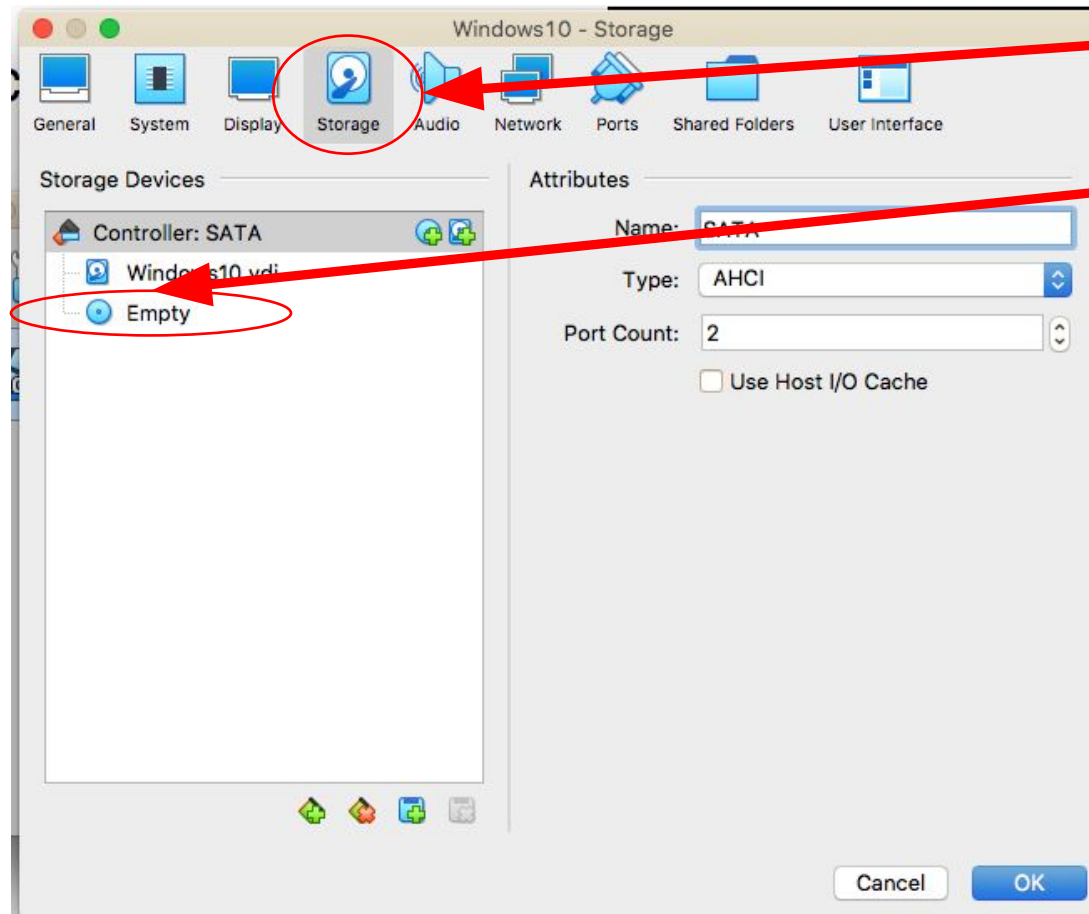
Click Continue

Install Windows 10 in VM (1)



Click on settings

Install Windows 10 in VM (2)

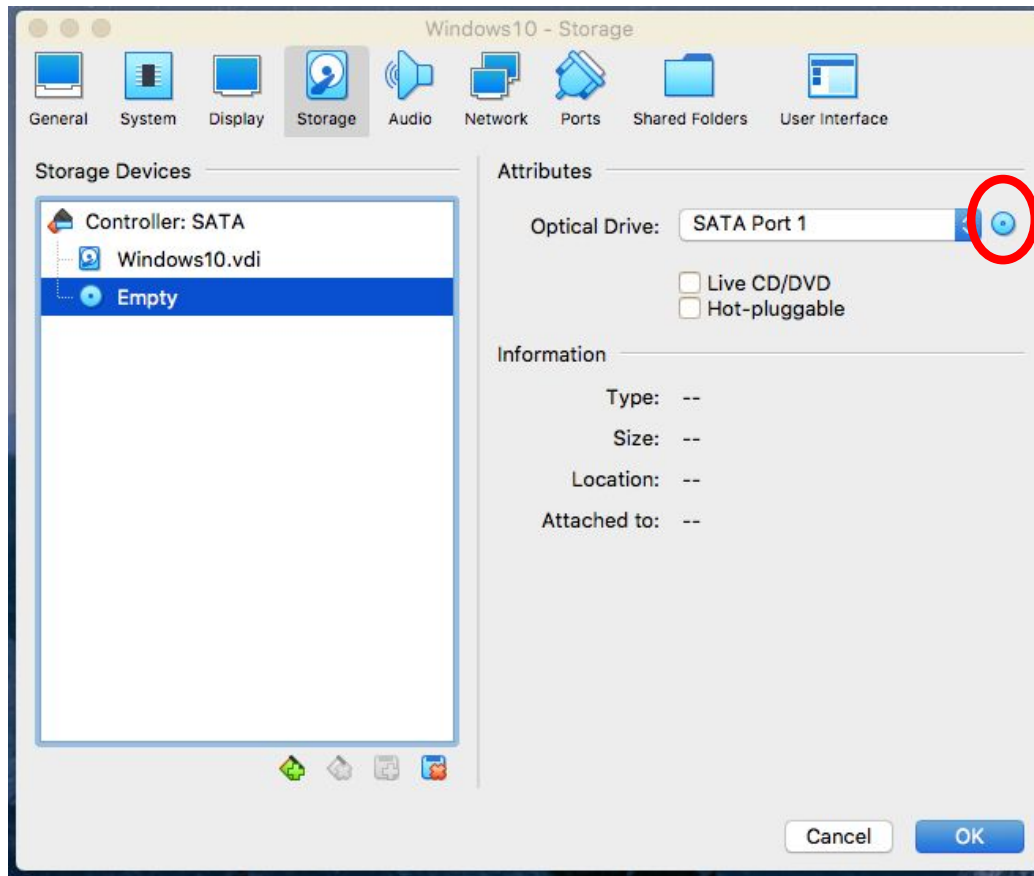


(1) Select storage

(2) Click the disk icon

Note : Here you load the windows iso file

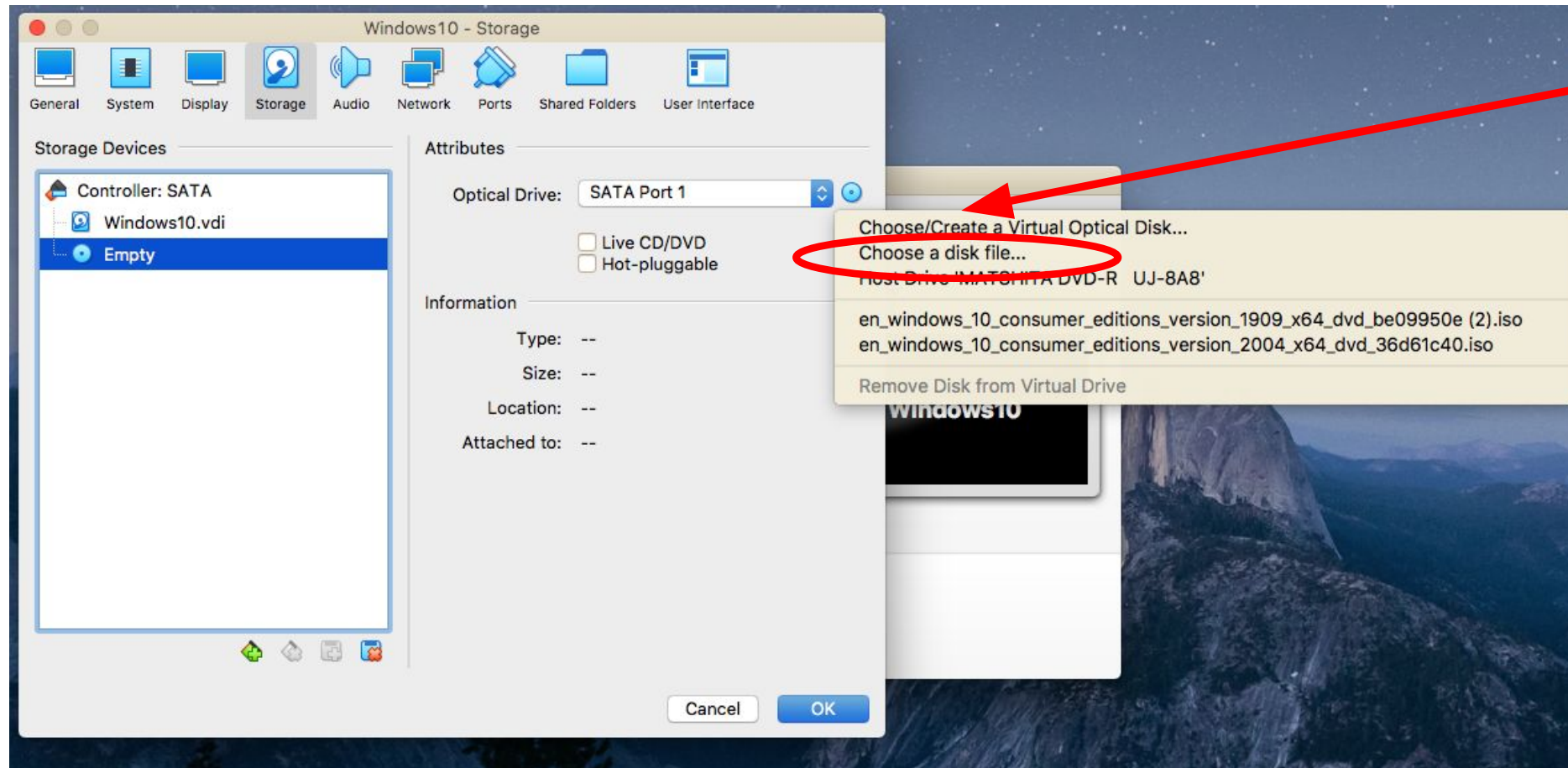
Install Windows 10 in VM (3)



Click the disk icon

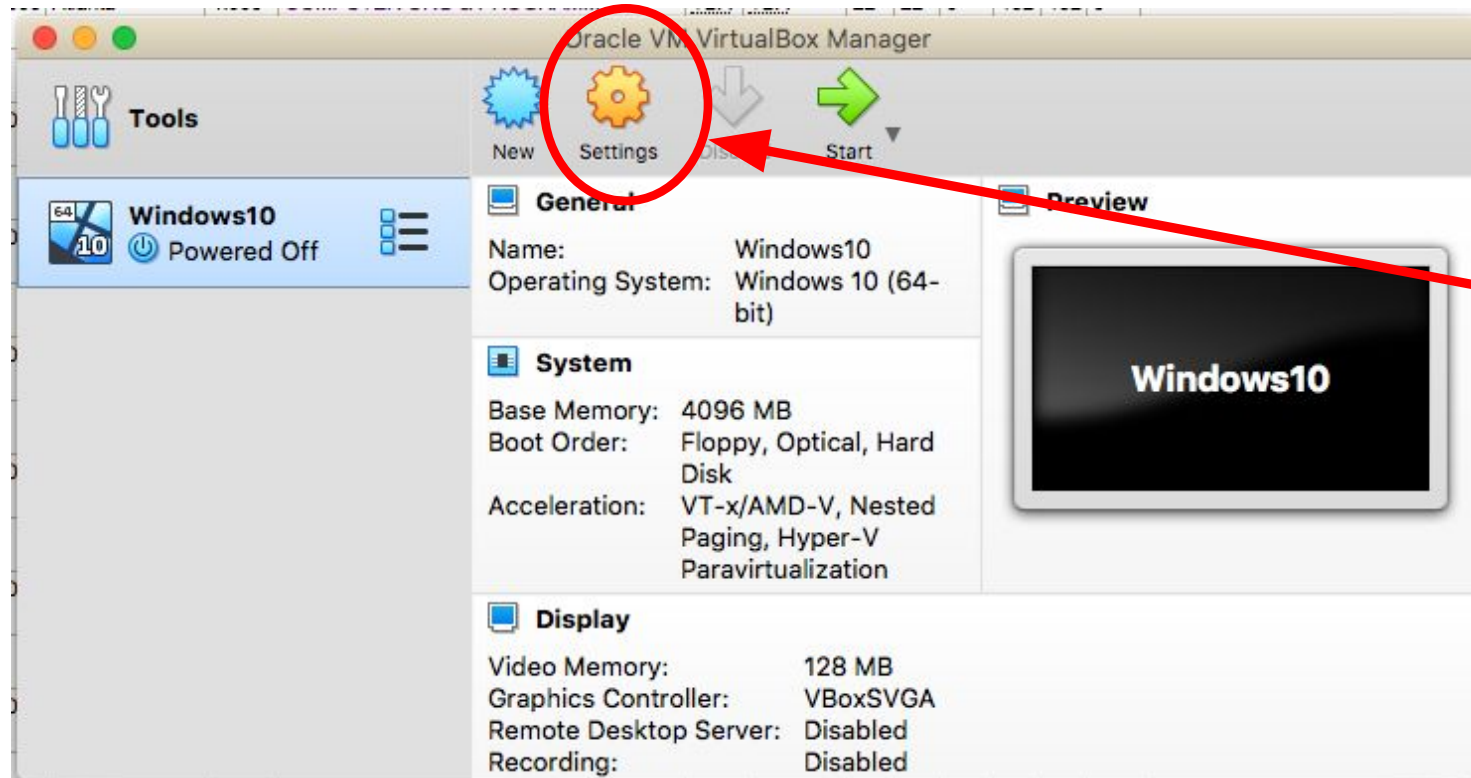
Note: It will show you options to load Windows ISO file.

Install Windows 10 in VM (4)



Select the
ISO file
from the
directory

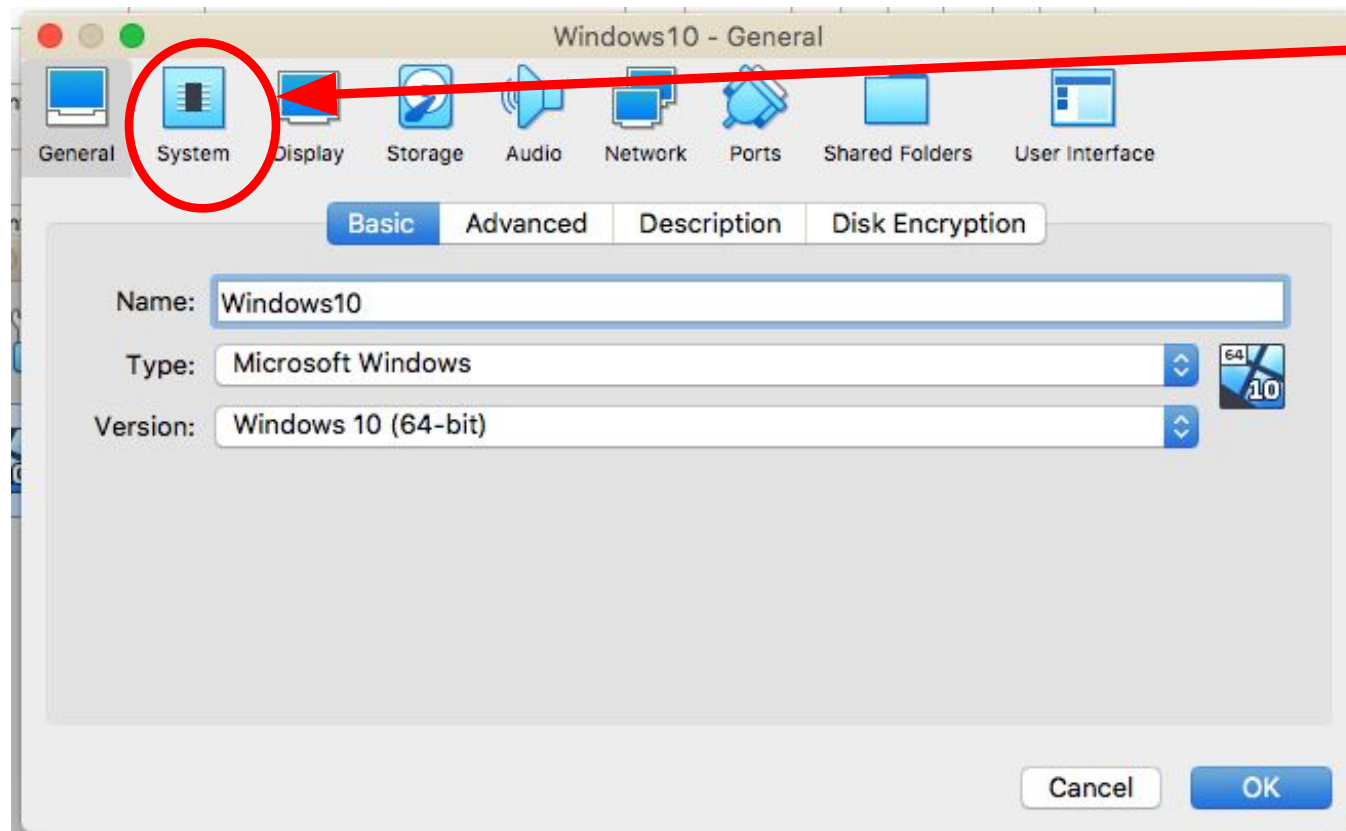
Install Windows 10 in VM (5)



Click settings

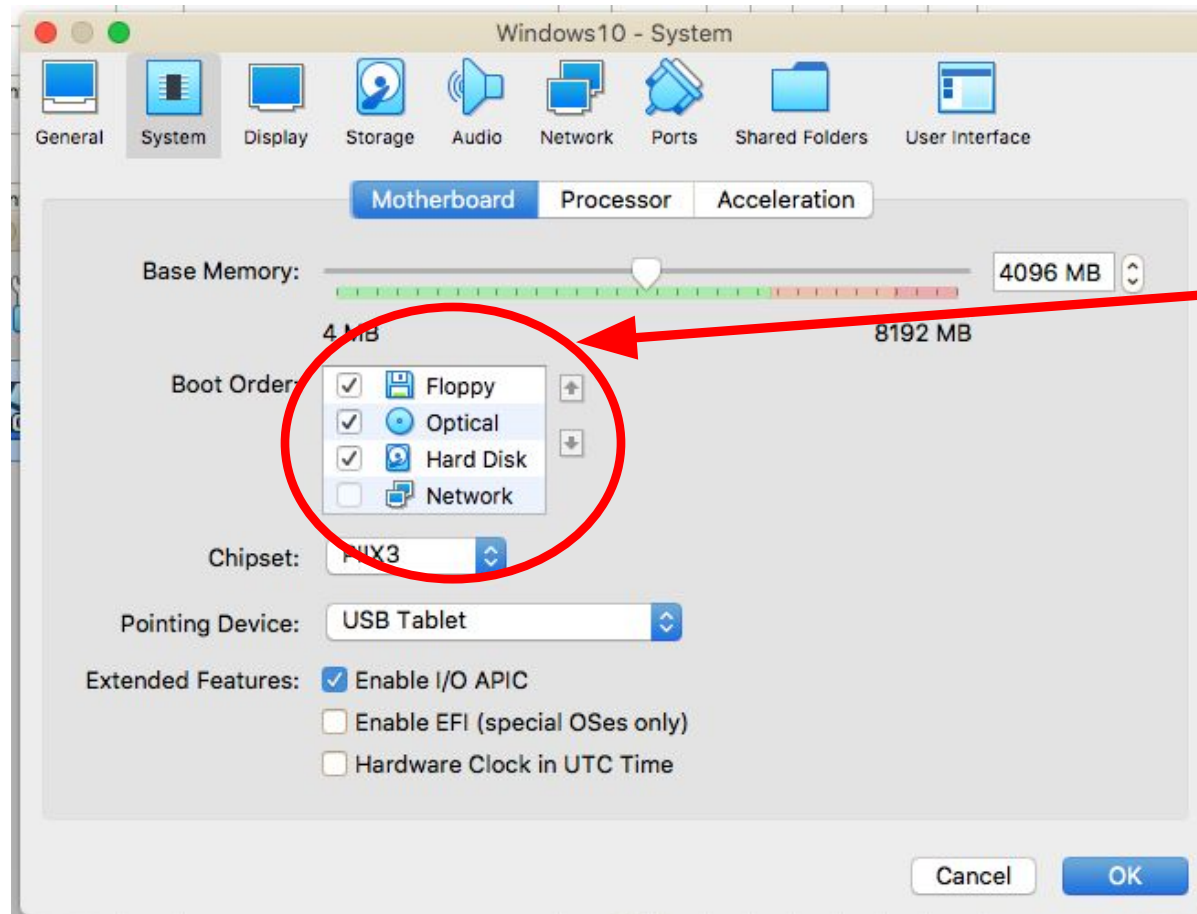
Note : Check the boot order

Install Windows 10 in VM (7)



Click System

Install Windows 10 in VM (8)



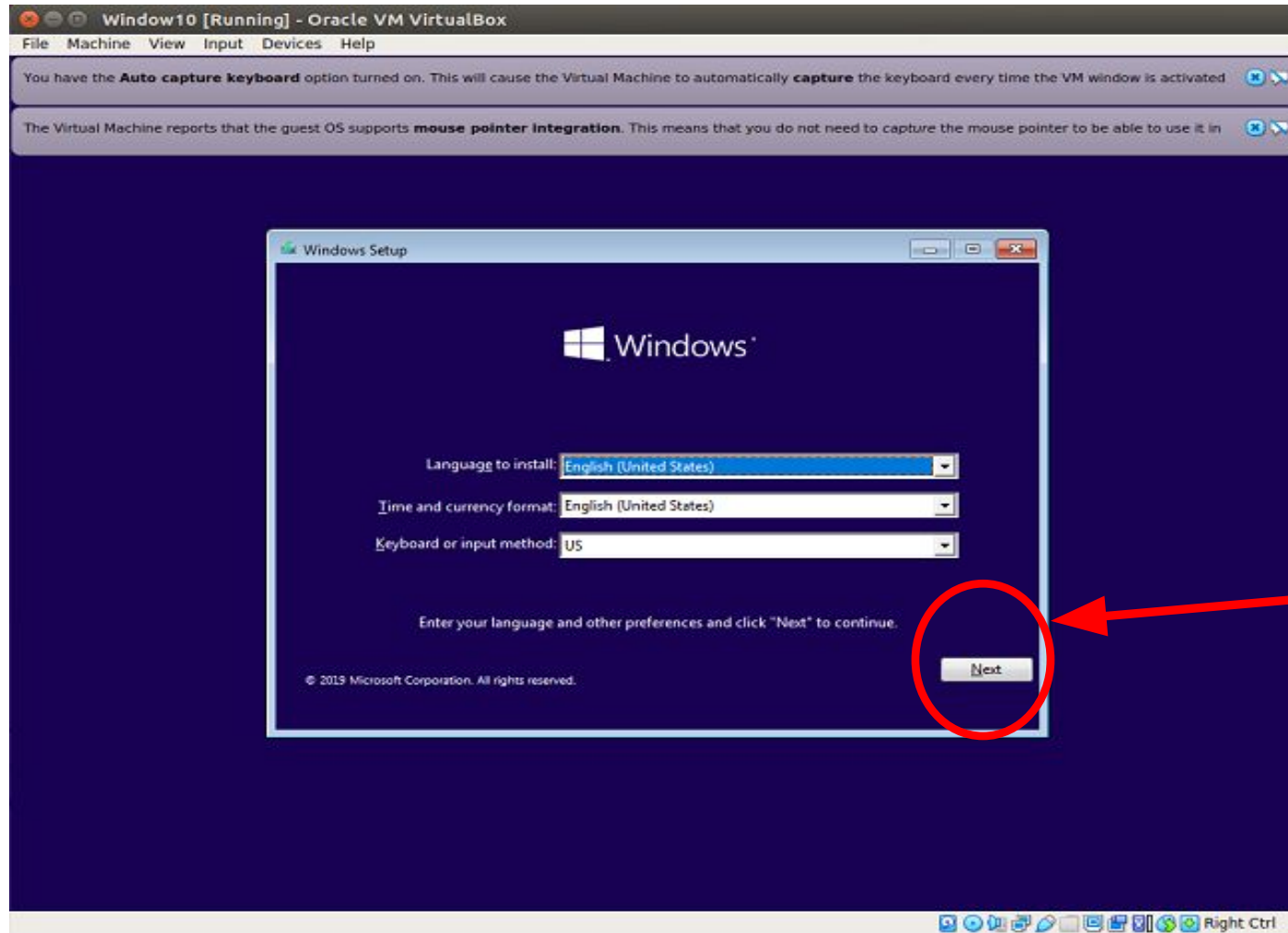
Boot order should be like this.

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)

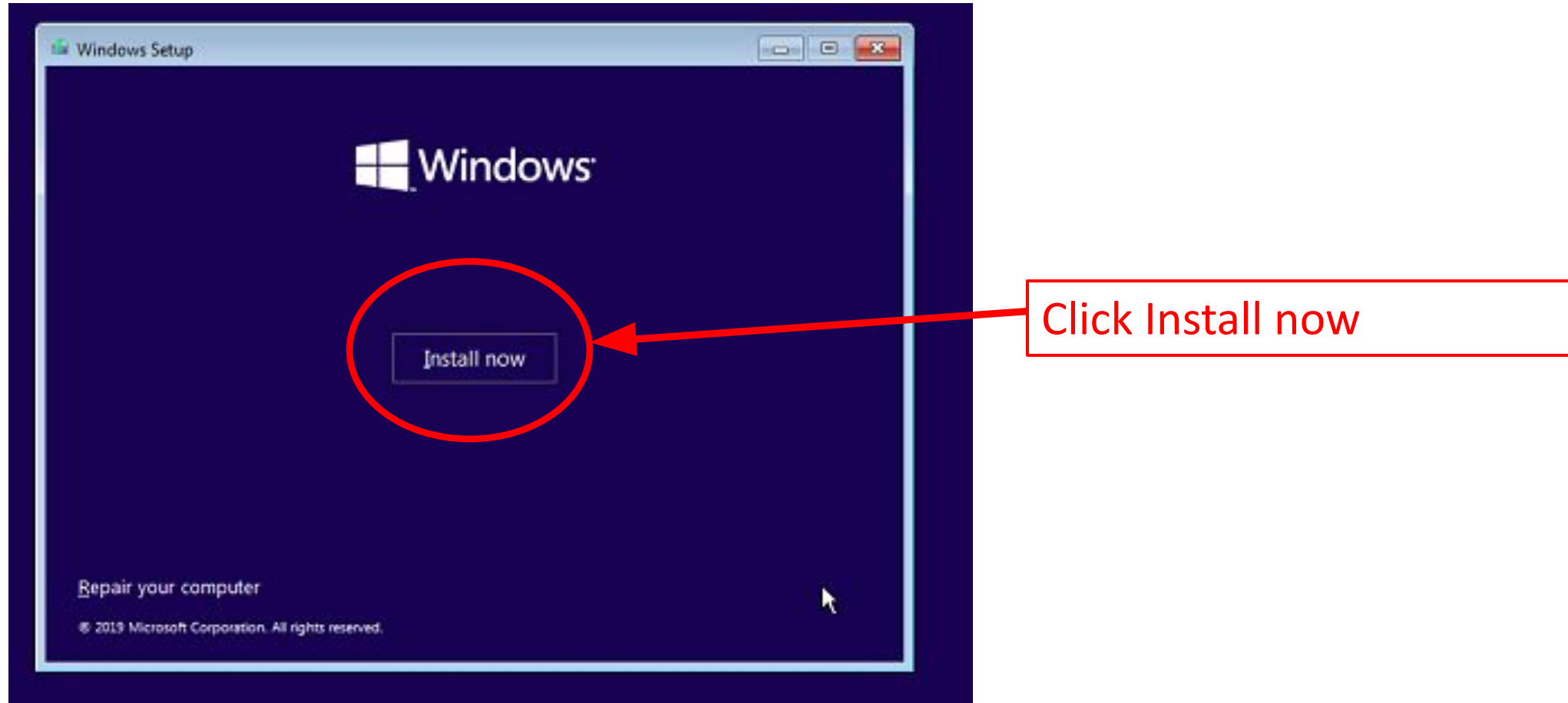


Install Windows 10 in VM (9)

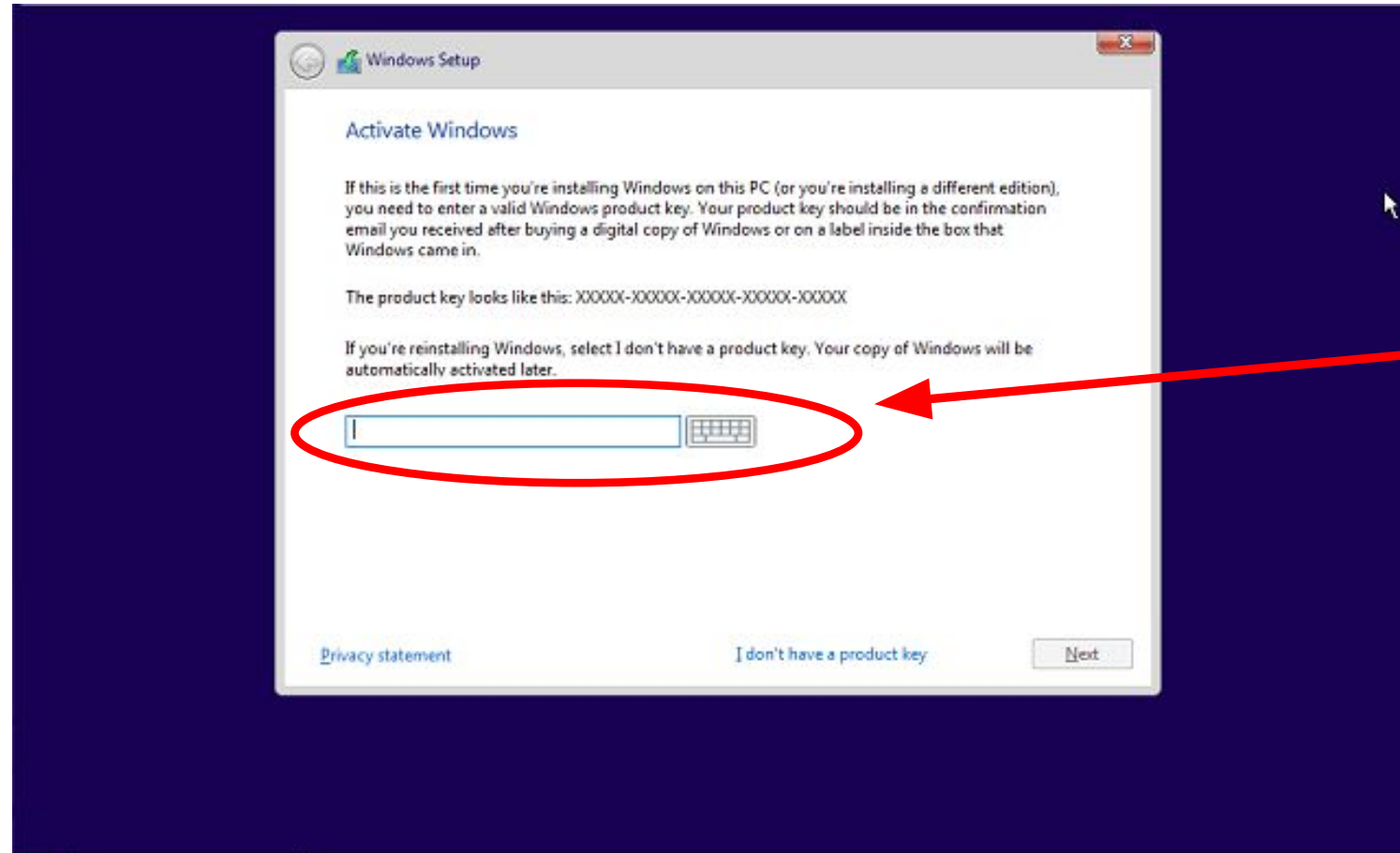


Click Next

Install Windows 10 in VM (10)

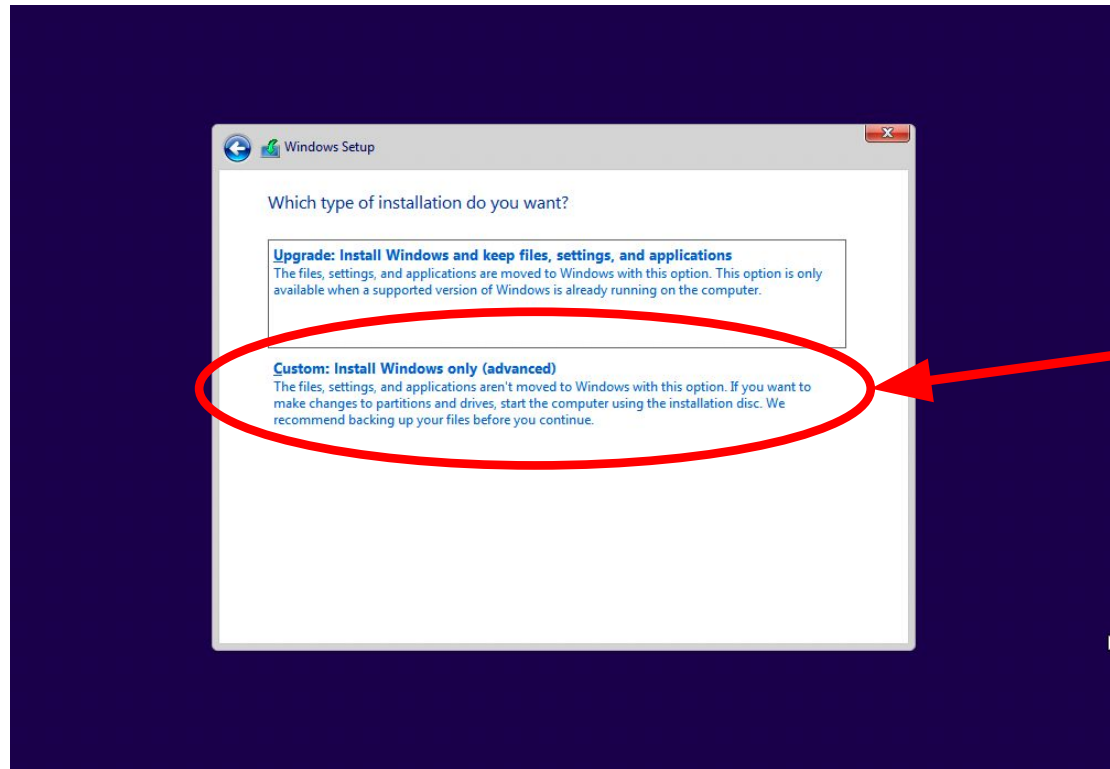


Install Windows 10 in VM (11)



Provide key
that you stored
in the text file

Install Windows 10 in VM (12)

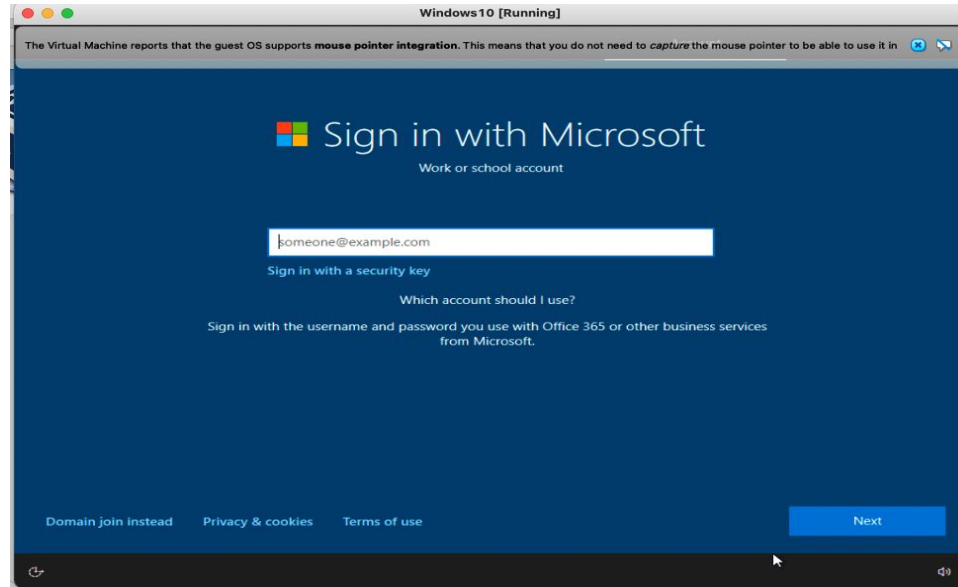


Select custom
installation

Then click next to
start installation

Install Windows 10 in VM (13)

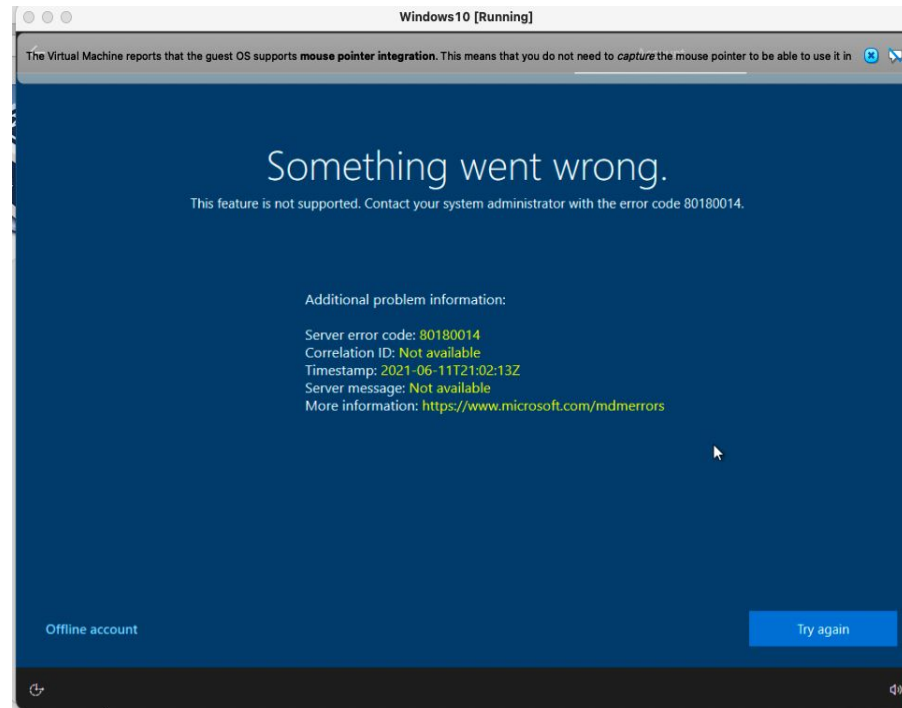
- After the installation system will reboot.



- 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/>

Have you tried the latest Visual Studio?

Try the latest Visual Studio 2019 to create your ideal IDE, build smarter apps, integrate with the cloud, optimize for performance, and stay ahead of the curve

Download Visual Studio 2019 ▾

Download Visual Studio 2019 for Mac ↓

[Check out what's new in Visual Studio 2019](#)

Expand the arrow

Visual Studio setup

Have you tried the latest Visual Studio?

Try the latest Visual Studio 2019 to create your ideal IDE, build smarter apps, integrate with the cloud, optimize for performance, and stay ahead of the curve

Download Visual Studio 2019 ▾

Community 2019

Professional 2019

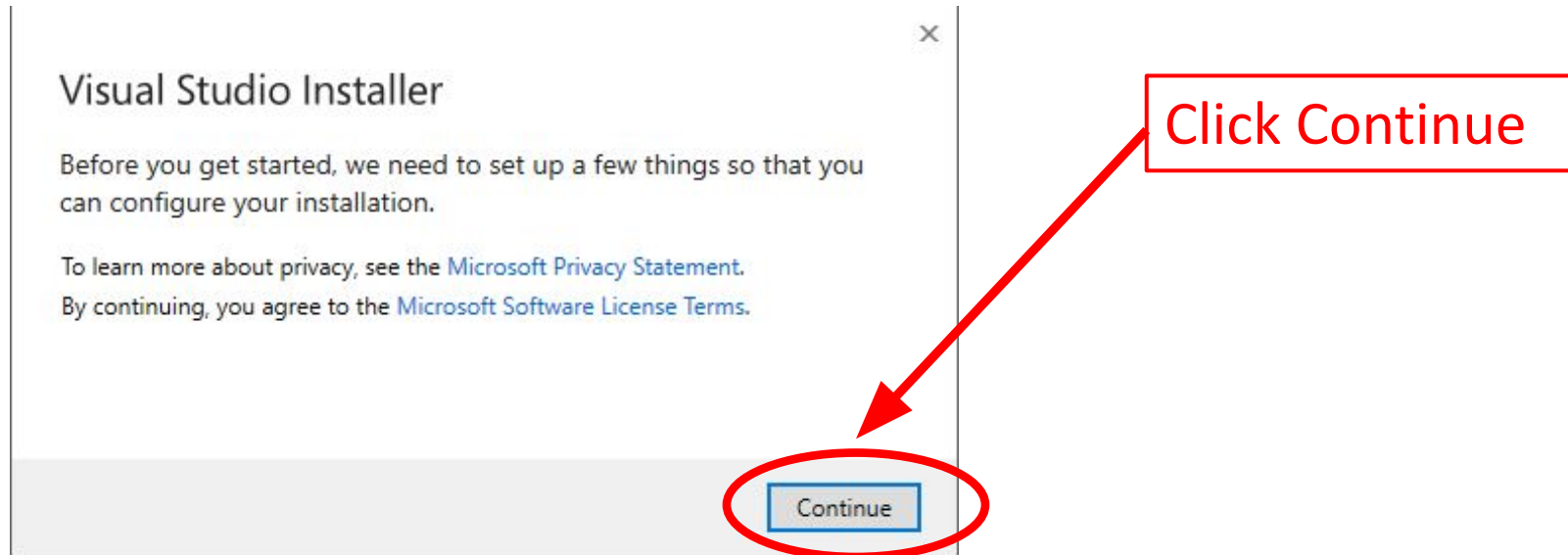
Enterprise 2019

Download Visual Studio 2019 for Mac ▾

Download community
2019 edition

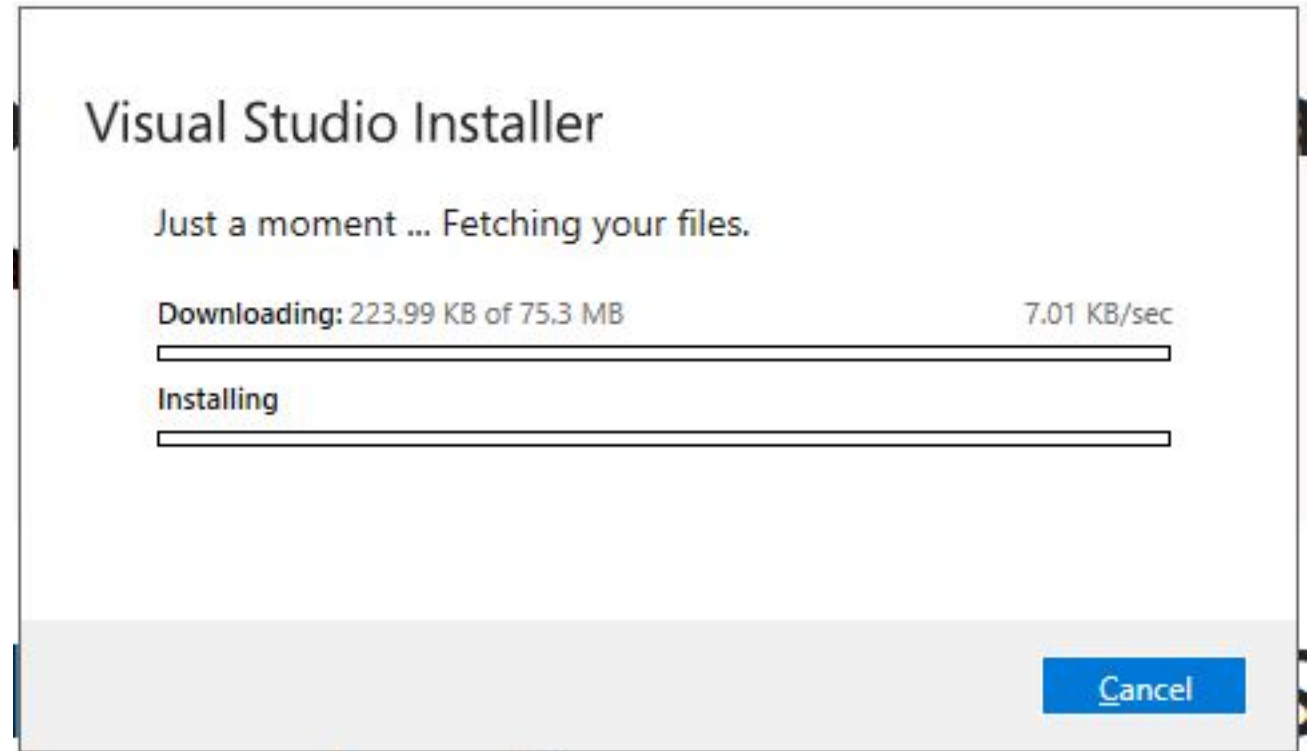
Visual Studio Setup

- Double Click the installer
- Click Continue button

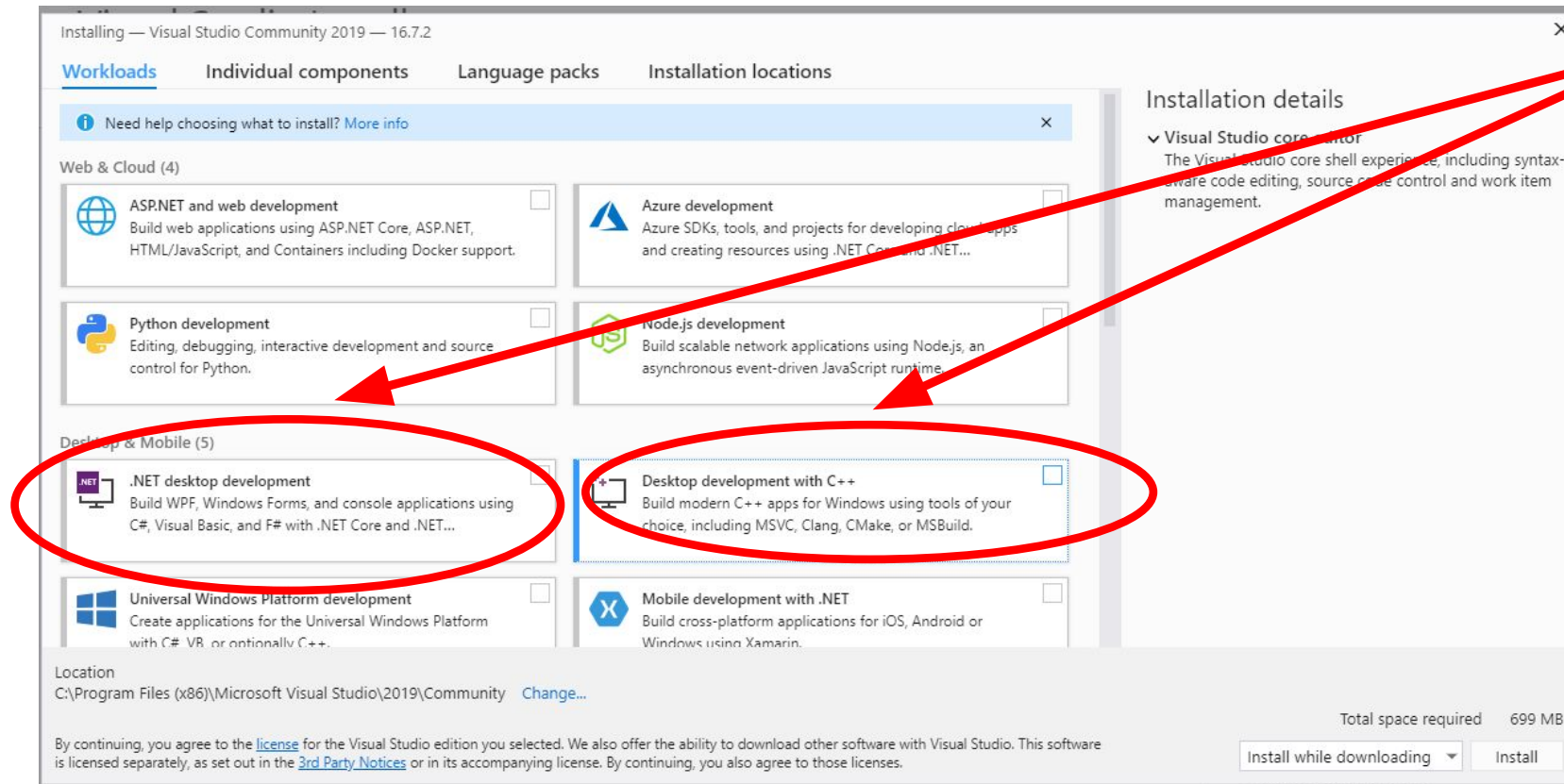


Visual Studio Setup

It will start downloading files

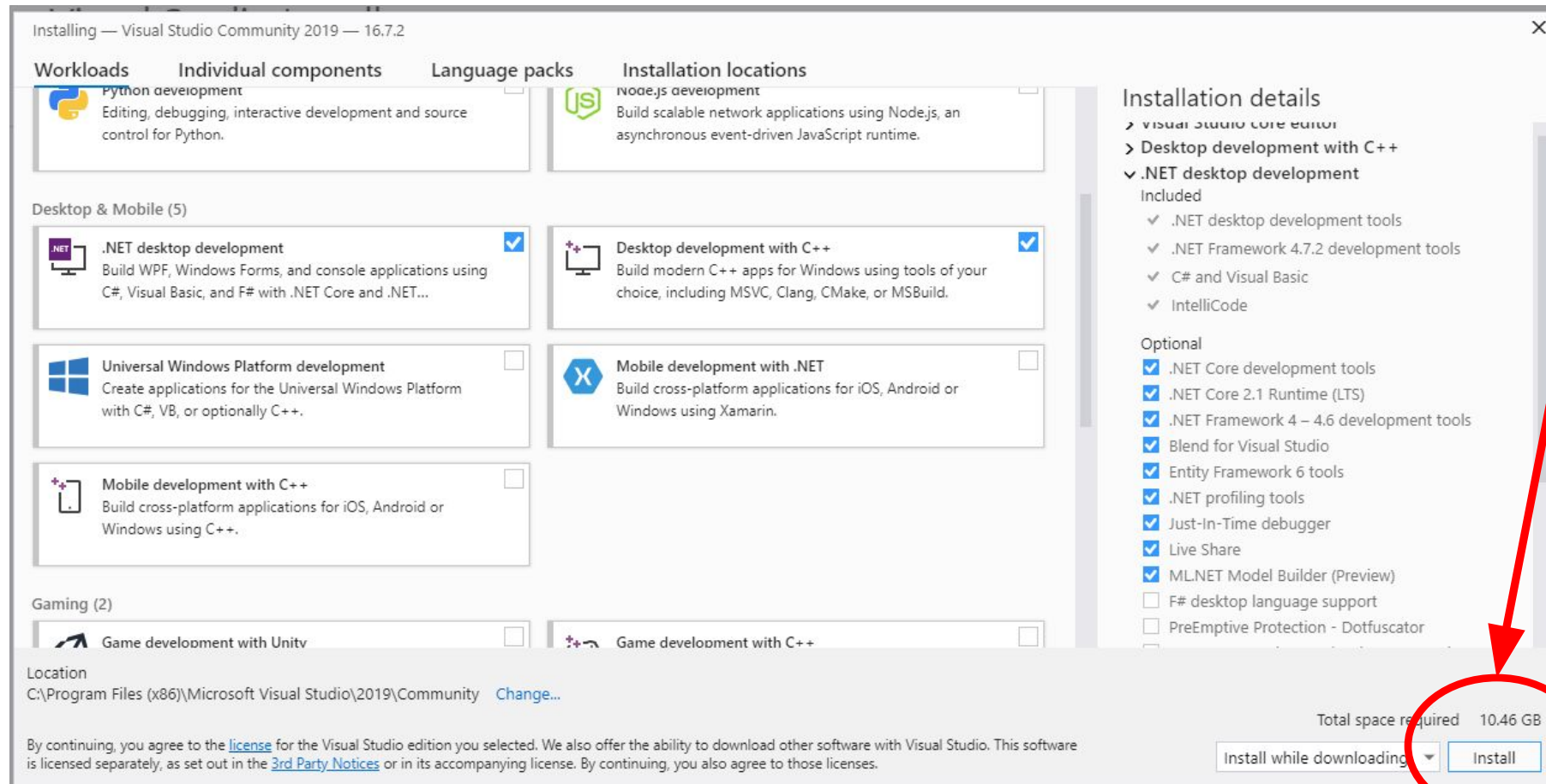


Visual Studio Setup



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

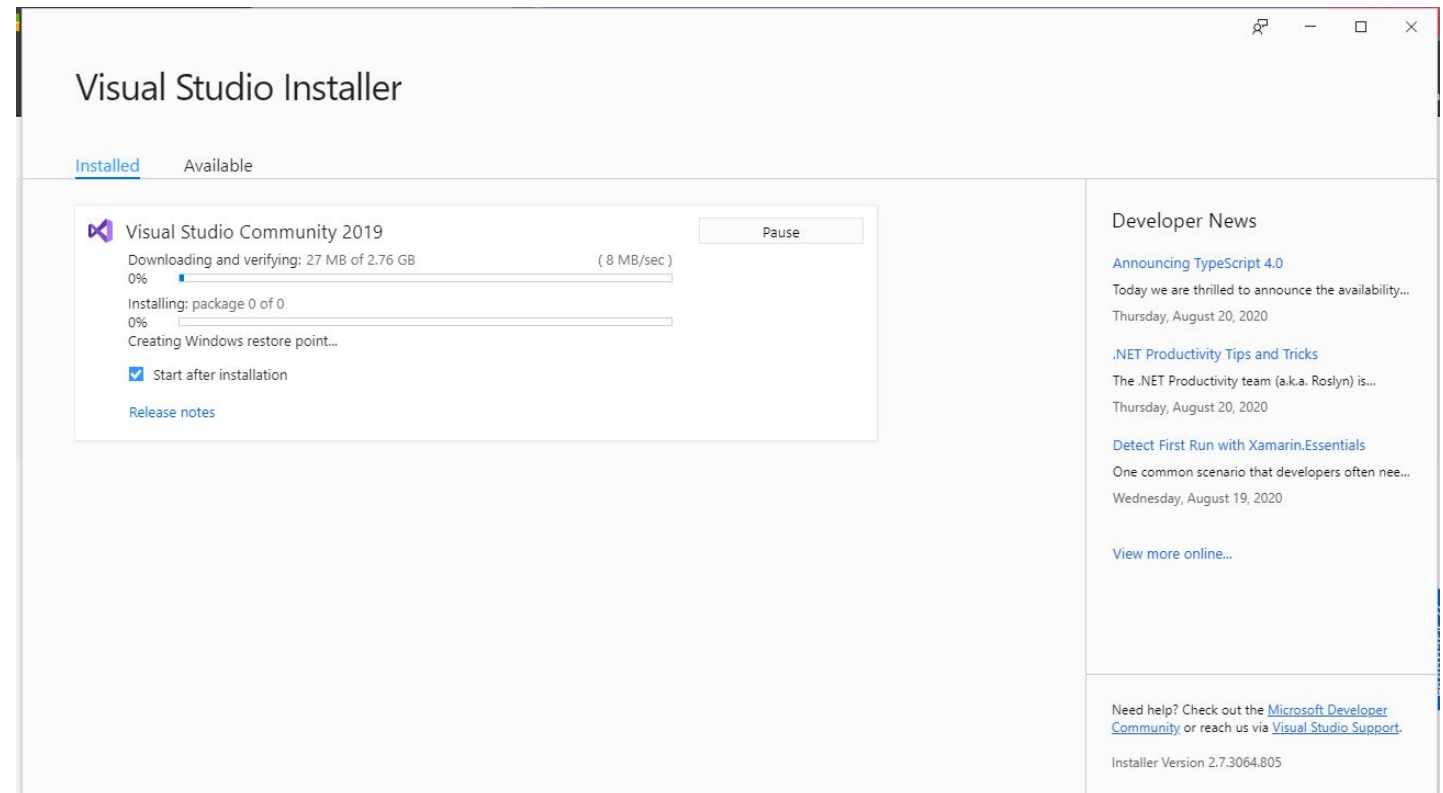
Visual Studio Setup



Click install

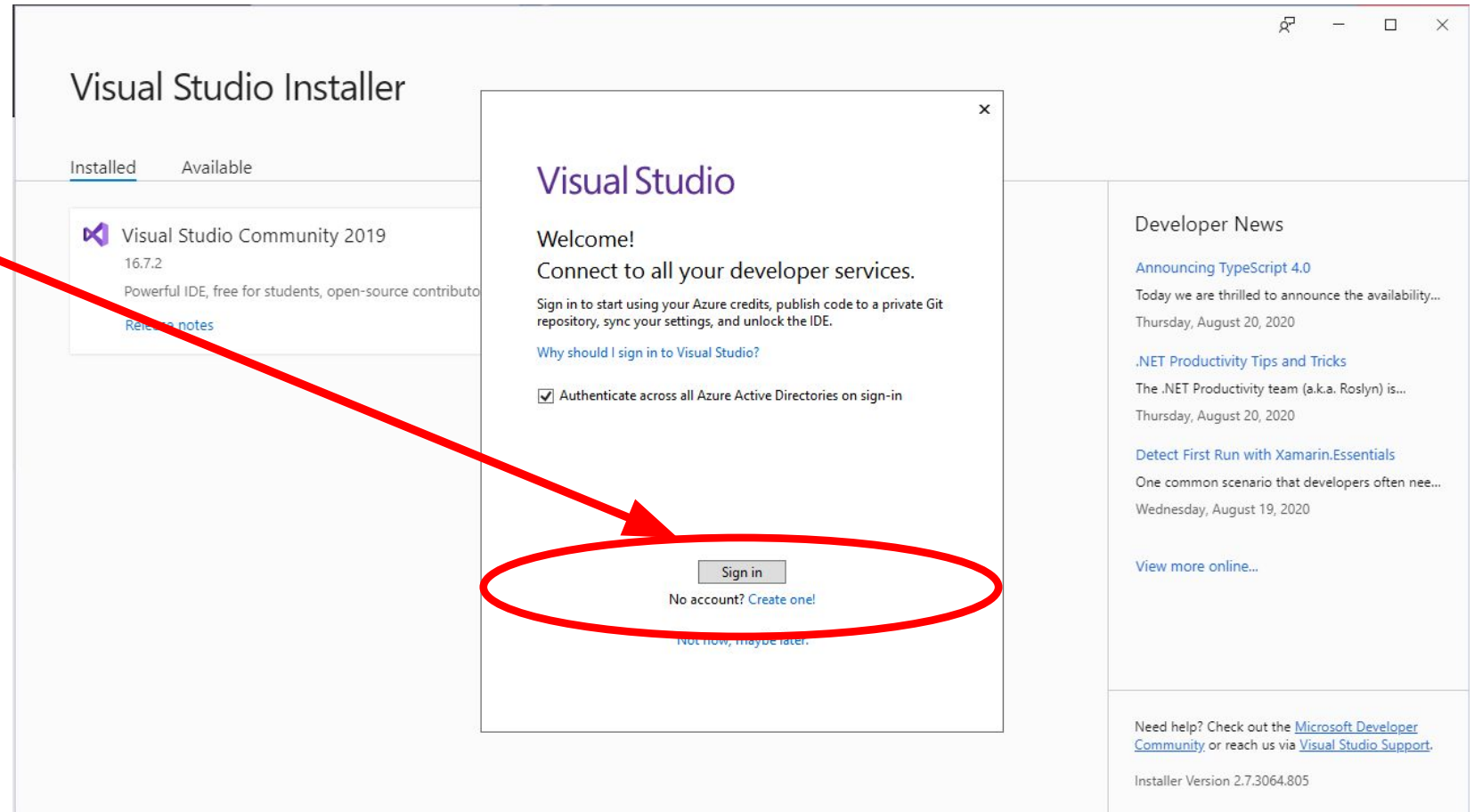
Visual Studio Setup

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

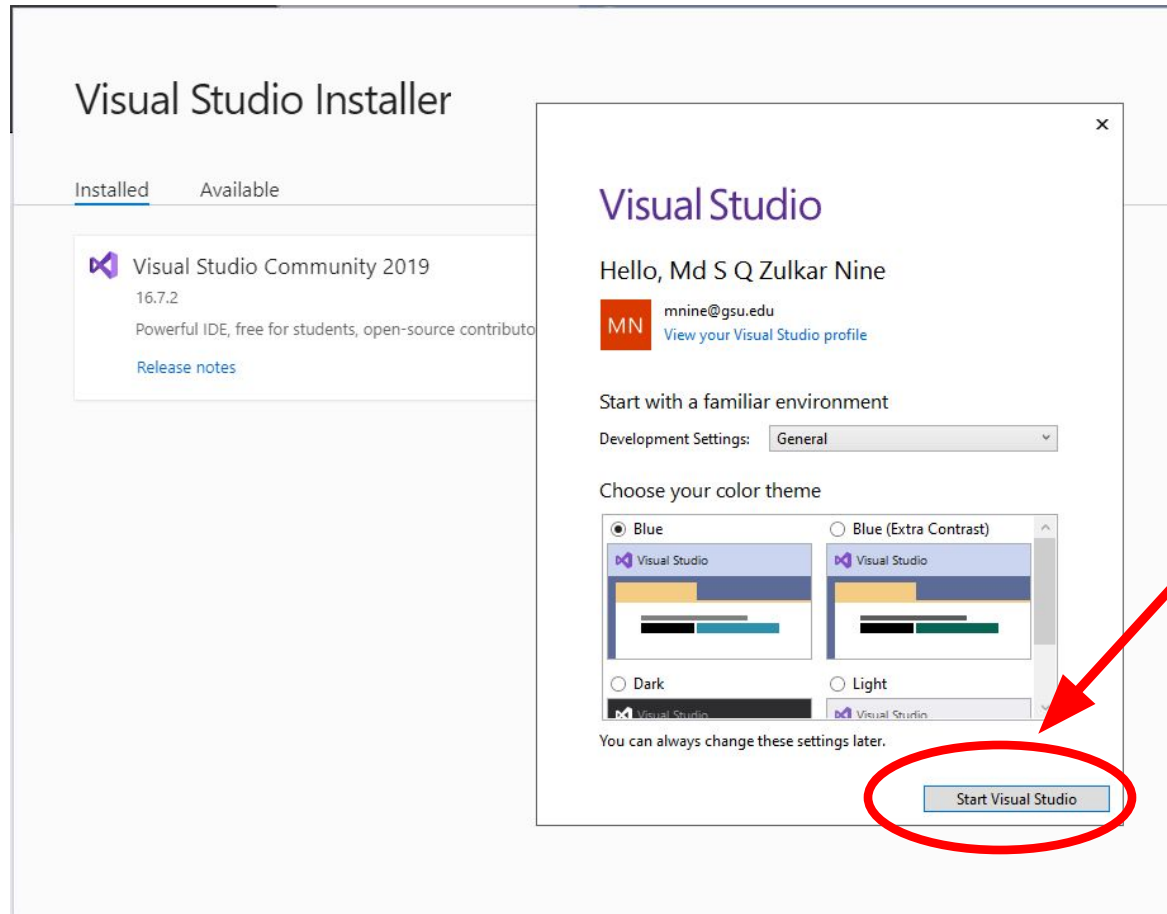


Visual Studio Setup

- 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:

$$\begin{array}{ccccccc} & & 3 & A & C & 4 & \\ & \swarrow & \searrow & \searrow & \searrow & & \\ \hline 3 \times 16^3 & + & 10 \times 16^2 & + & 12 \times 16^1 & + & 4 \times 16^0 = 15044 \end{array}$$

Examples

- Example 3: Convert the following number into two's complement 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

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

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

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

$$1 + 3 + 2 = 6; \quad 6 \text{ is 6 in Hex}$$

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

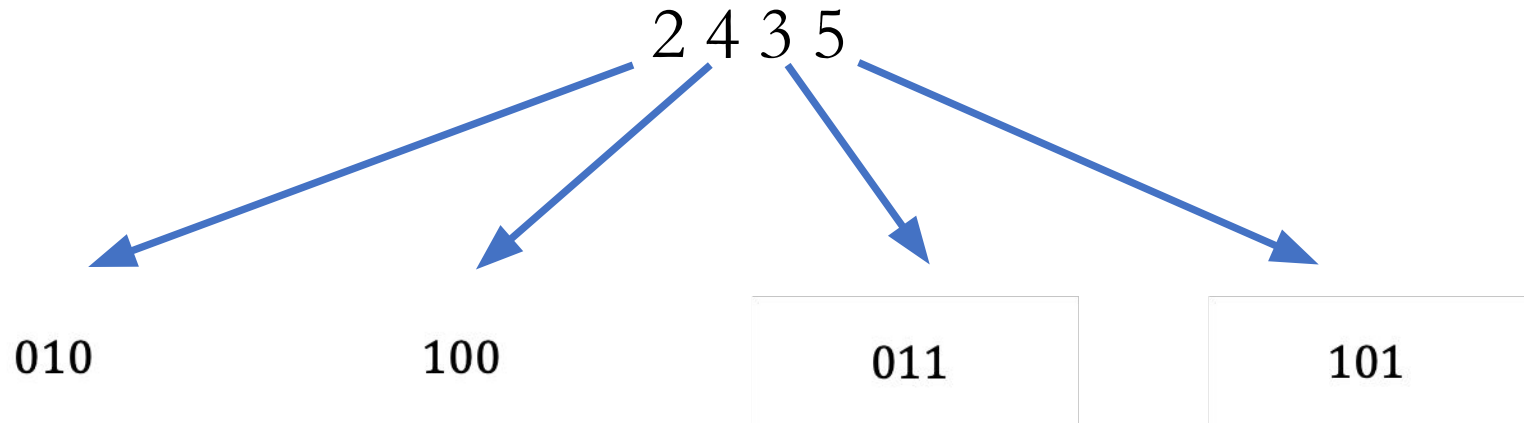
| | | | |
|-----|-----|-----|-----|
| 010 | 100 | 011 | 101 |
|-----|-----|-----|-----|

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

$$7 + 3 = 10; \frac{10}{8} = 1, \text{rem } 2$$

$$1 + 6 + 2 = 9; \frac{9}{8} = 1, \text{rem } 1$$

$$1 + 5 + 1 = 7;$$

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