

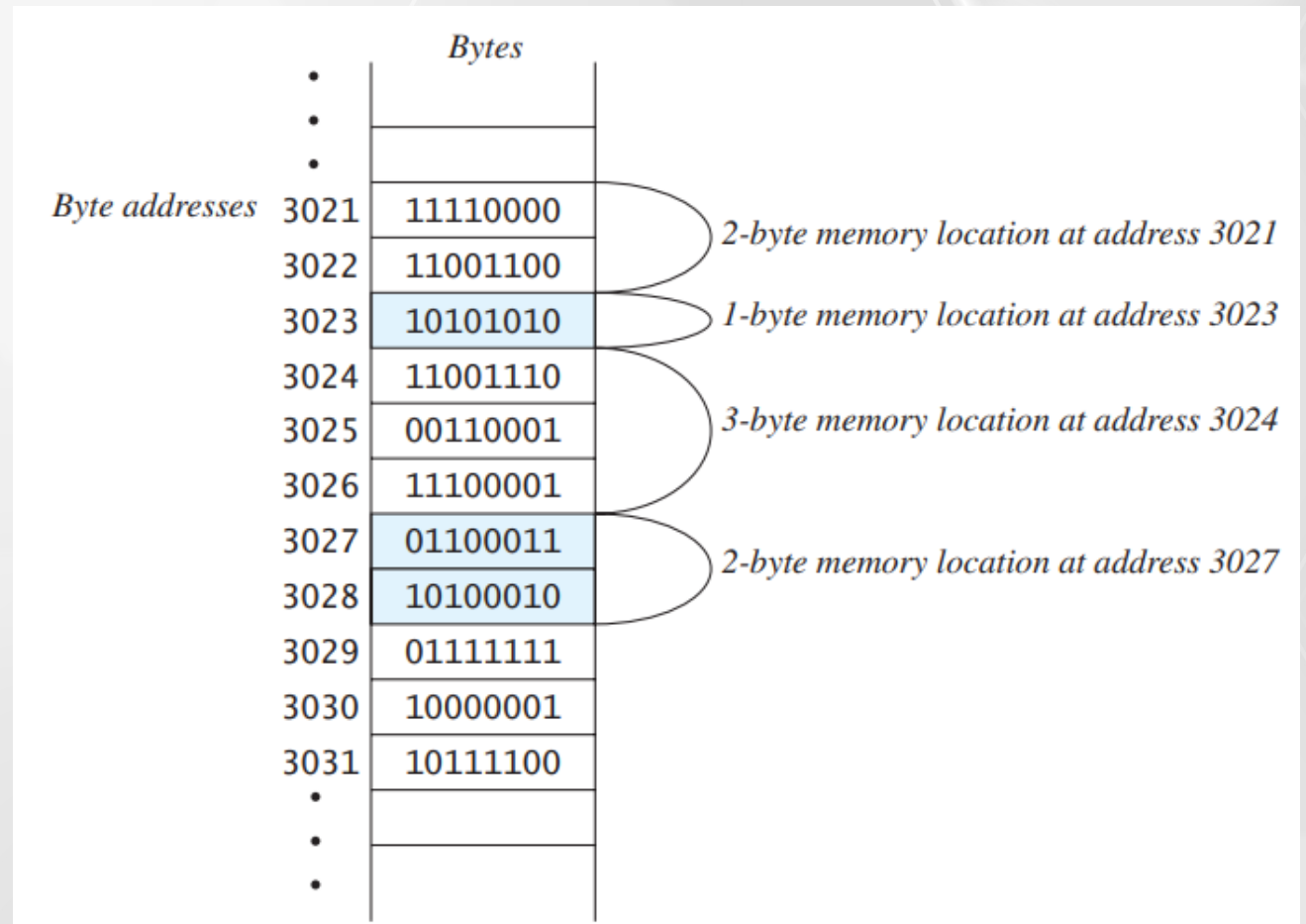
# COMP2045

## Programming and Problem Solving

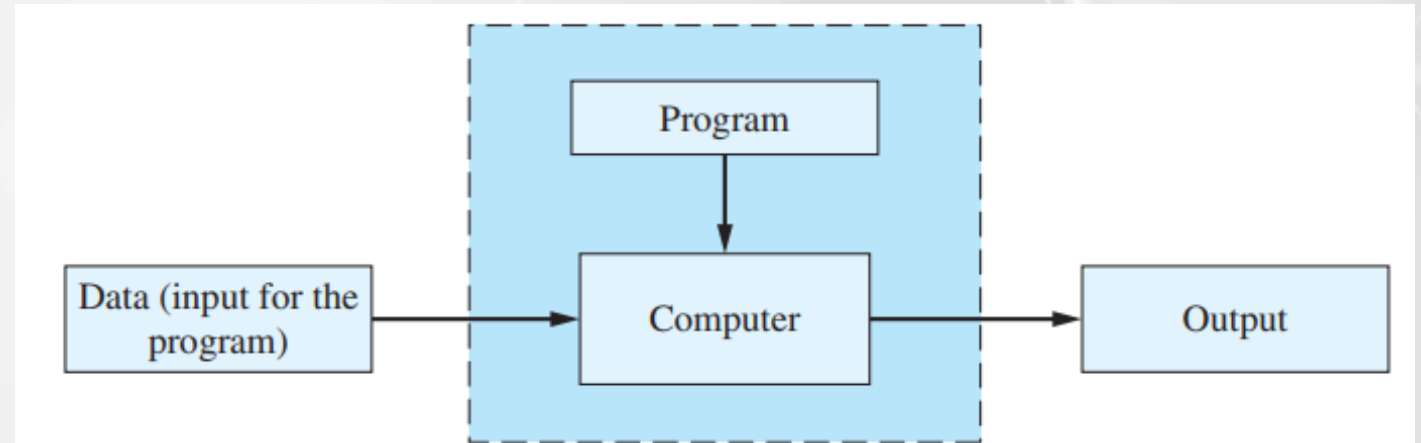
### Introduction to Java Programming

- Computer systems consist of hardware and software
- Hardware:
  - CPU, the master mind that gives instruction
  - Volatile memory, RAM, that holds data for the current program
  - Persistent memory, HD, that holds more data, more reliable, yet slower

- Data stored in main memory is represented as binary, grouped into a byte (8-bits).
- One byte of integer can only represent the possible value of 0 to 255.
- A larger number uses a few adjacent bytes.
- Each memory slot has an address.
- A 32-bits system means we use 32-bits to store an address.



- Normally an **Operating System** is responsible to launch a program.
- A runnable program is **compiled** into some code (e.g. `.exe`) that can be executed on a computer platform.



Why can't we double-click-run an Android APK on Windows?

## Compiler

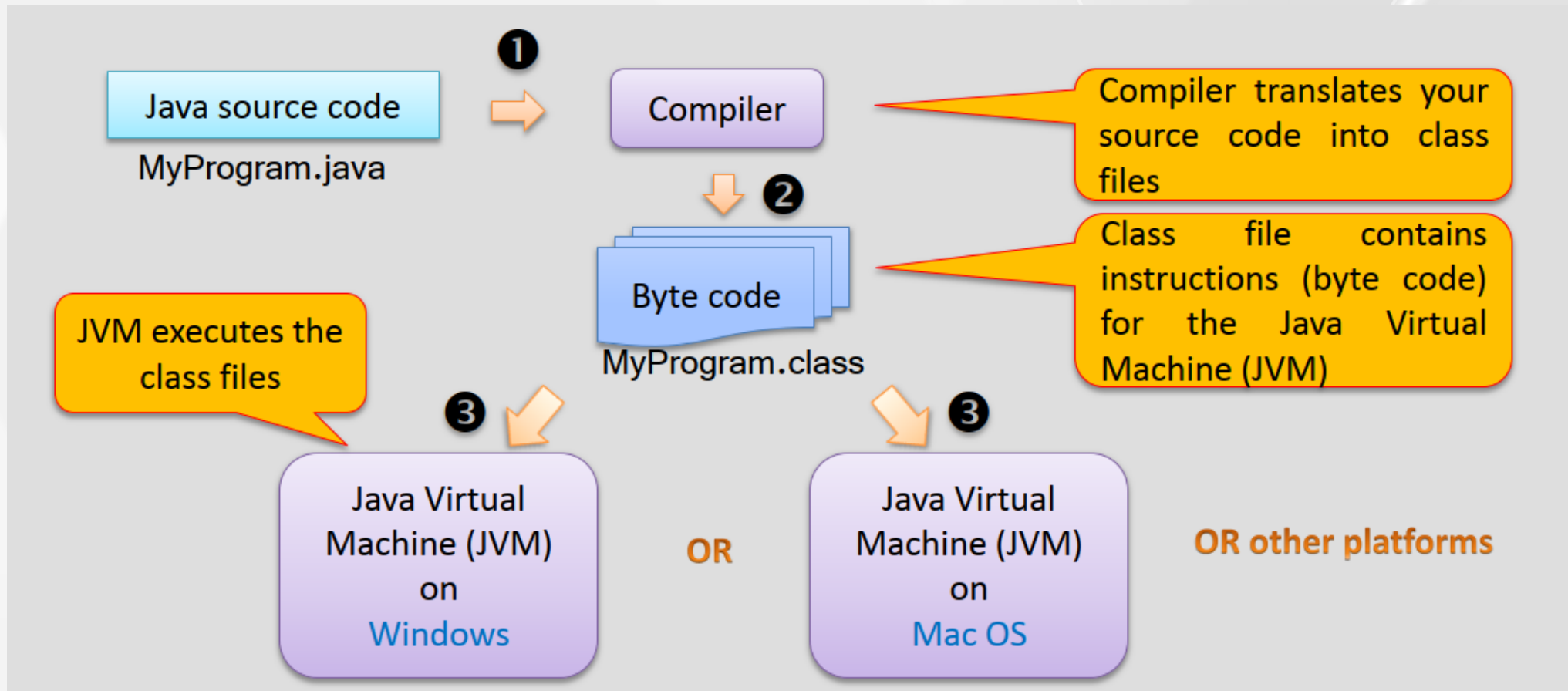
- Compiler is a special type of computer program
- Translates human writing programming code to runnable code
- A program needs to be compiled for once only
- Compiled code can be executed directly
- More efficient
- e.g. C/C++

## Interpreter

- Interpreter does not compile code.
- Translates source code line-by-line while it is running
- More portable
- e.g. Python/VBA/bash script

# Java Bytecode


- Java compiler *compiles* source code into **bytecode**.
- A **Java Virtual Machine (JVM)** *interprets* the bytecode.



# Compile Our First Java Program

```
1 public class HelloWorld {  
2     public static void main(String argv[]) {  
3         new HelloWorld().runApp();  
4     }  
5     public void runApp() {  
6         System.out.println("Hello World!");  
7     }  
8 }
```

Name this file HelloWorld.java

 In Windows system filename is not case sensitive. As a good habit you should strictly follow the case of your class name.

# Compile Our First Java Program

## Linux

```
$ ls
HelloWorld.java
$ javac HelloWorld.java

$ ls
HelloWorld.class HelloWorld.java

$ java HelloWorld
Hello World!
```

- `ls` - a Linux command for listing the file under the current directory
- `javac HelloWorld.java` - compiles the source program `HelloWorld.java` into a class file `HelloWorld.class`
- `java HelloWorld` - it executes the compile java program `HelloWorld`.

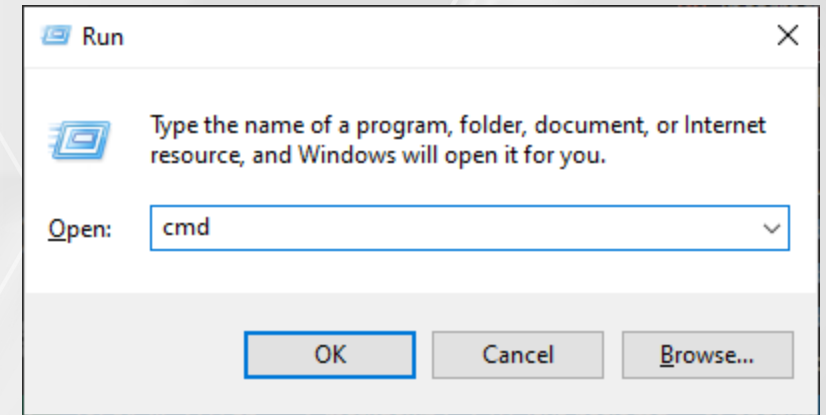
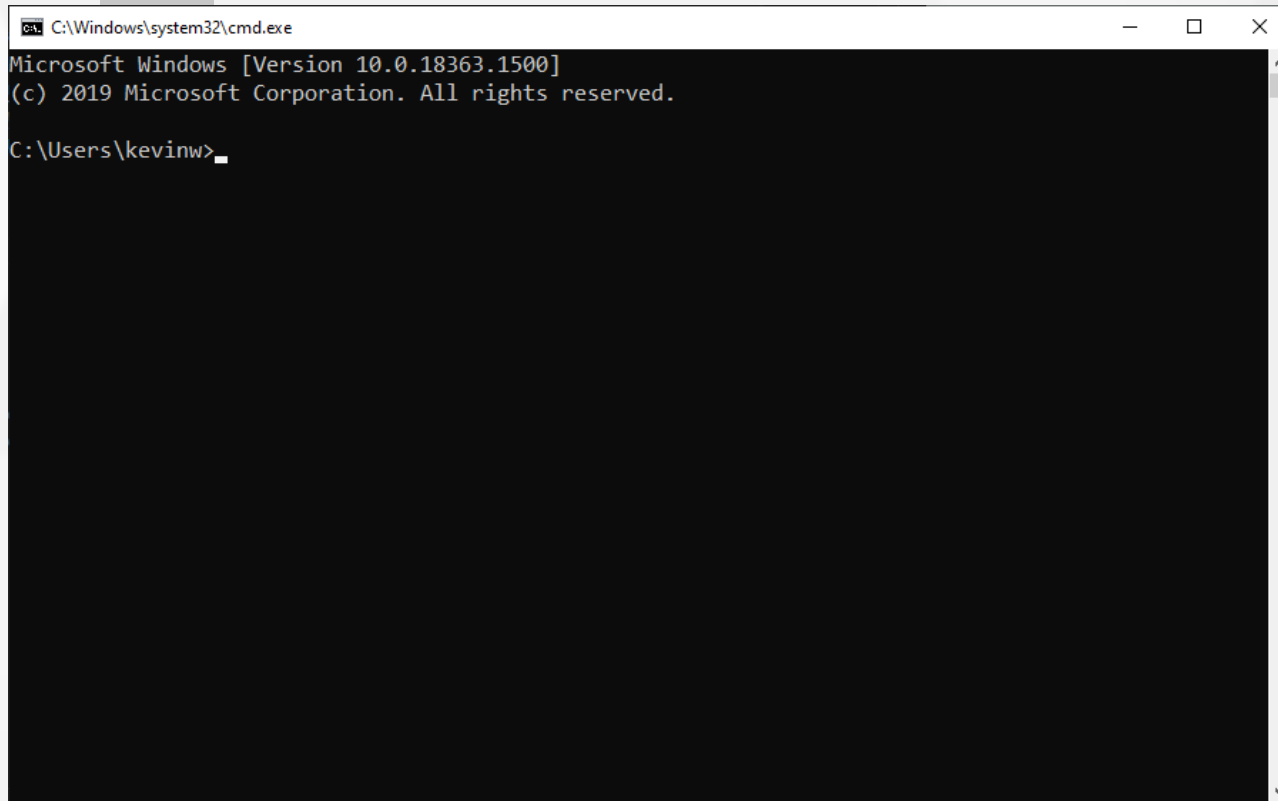
## Windows' Command Prompt

1. Start a Command Prompt
2. Create your Java source file (`HelloWorld.java`)
3. Compile the source file
4. Run the program

# Compile Our First Java Program

## Start a Command Prompt

1. Press **Windows Key** + **R** to launch **Run**
2. Type **cmd** in the box and click **OK**.



# Compile Our First Java Program

```
C:\Users\kevinw>cd Desktop

C:\Users\kevinw\Desktop>mkdir MyFirstJava

C:\Users\kevinw\Desktop>cd MyFirstJava

C:\Users\kevinw\Desktop\MyFirstJava>Dir

Volume in drive C has no label.
Volume Serial Number is 91D0-BC80


Directory of C:\Users\kevinw\Desktop\MyFirstJava

05/11/2021    04:12 PM        <DIR>          .
05/11/2021    04:12 PM        <DIR>          ..
               0 File(s)                0 bytes
               2 Dir(s)  604,250,165,248 bytes free

C:\Users\kevinw\Desktop\MyFirstJava>notepad HelloWorld.java
```

# Compile Our First Java Program

- Use the program **Notepad** to edit `HelloWorld.java`.
- Save after you have done.
- Make sure the **Save as type** is All Files.
- Do not use **Wordpad** or **Word**.

 Files saved in Wordpad or Word has their own format and its own file extension. Moreover, Word processors will convert the symbol quotation `"` to `“` which cannot be recognized by the compiler.

# Compile Our First Java Program

```
C:\Users\kevinw\Desktop\MyFirstJava>dir
Volume in drive C has no label.
Volume Serial Number is 91D0-BC80

Directory of C:\Users\kevinw\Desktop\MyFirstJava

05/11/2021  04:41 PM    <DIR>          .
05/11/2021  04:41 PM    <DIR>          ..
05/11/2021  04:41 PM                199 HelloWorld.java
                1 File(s)                199 bytes
                2 Dir(s)  604,243,447,808 bytes free

C:\Users\kevinw\Desktop\MyFirstJava>javac HelloWorld.java

C:\Users\kevinw\Desktop\MyFirstJava>java HelloWorld
Hello World!

C:\Users\kevinw\Desktop\MyFirstJava>
```

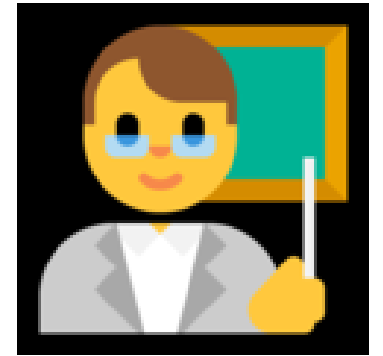
- Integrated Development Environment (IDE) - Software application that helps us:
  - Editing our programs
  - Compiling our programs
  - Executing our programs; and
  - Debugging our programs
- Popular IDEs for Java:
  - NetBeans
  - Eclipse
  - **IntelliJ**
  - Visual Studio Code

# Compiling a Java Program with IntelliJ

 [Youtube](#)



Compile First  
Java Program  
with IntelliJ



- We want to leave some remarks/comments inside our program to enhance the readability.
- Comments in Java are not read by the compiler<sup>^</sup>.
- Comments can be taken in either form

Line comment: texts after the symbol `//` are comments

```
// line comment  
// another line comment
```

Block comment: texts between the symbol `/*` and `*/` are comments

```
/* First lines of comments  
   Another lines of comments */
```

- W. Savitch and F Carrano, "Java An Introduction to Problem Solving & Programming," Pearson, 6th Ed.