**WELCOME SNACK**

**Instruction: Read chapter 1 in Java; How to Program and answer all questions.**

1. Answer questions 1.4 to 1.8 of the exercises in chapter 1.

2. Explain briefly, the Java compilation process in your own words.

3. Differentiate between the JDK and JRE.

4. If the computer is so smart, why do we need a compiler?5. Do a one-page(if typed(A4- font 10), else(1 foolscap sheet)) summary of the entire chapter.

Here are more links and resources to help out:

* <https://www.freecodecamp.org/news/object-oriented-programming-concepts-21bb035f7260/>
* <https://www.quora.com/How-would-you-explain-OOP-to-a-5-year-old-kid-or-a-90-year-old-grandma>
* <https://funtechsummercamps.com/blog/explain-object-oriented-programming-to-kids/>
* <https://www.gnu.org/philosophy/free-sw.en.html>
* <https://www.forbes.com/sites/jacobmorgan/2014/05/13/simple-explanation-internet-things-that-anyone-can>-understand/?sh=7d56a5d01d09
* [https://azure.microsoft.com/en-us/overview/what-is-a-virtual-machine/](https://azure.microsoft.com/en-us/overview/what-is-a-virtual-machine/)
* <https://whatis.techtarget.com/definition/write-once-run-anywhere-WORA>
* <https://en.wikipedia.org/wiki/Java_virtual_machine>
* <https://edu.gcfglobal.org/en/computerbasics/understanding-operating-systems/1/>
* <https://www.javatpoint.com/java-bytecode>
* <https://m.youtube.com/watch?v=NeXQEJNWO5w&t=27s>

1. **Fill in the blanks in each of the following statements:**
2. The logical unit that receives information from outside the computer for use by the computer is the \_\_Input Unit.
3. The process of instructing the computer to solve a problem is called \_\_Computer programming.
4. High-Level Language \_\_is a type of computer language that uses English-like abbreviations for machine-language instructions.
5. Output Unit\_\_is a logical unit that sends information which has already been processed by the computer to various devices so that it may be used outside the computer.
6. The Memory Unit \_\_and Secondary Storage Unit\_\_ are logical units of the computer that retain information.
7. Aithmetic and Logical Unit (ALU) \_\_is a logical unit of the computer that performs calculations.
8. Aithmetic and Logical Unit (ALU) \_\_is a logical unit of the computer that makes logical decisions.
9. High-Level \_languages are most convenient to the programmer for writing programs quickly and easily.
10. The only language a computer can directly understand is that computer’s\_\_Machine Language .
11. The Central Processing Unit (CPU)\_\_is a logical unit of the computer that coordinates the activities of all the other logical units.

**1.5 Fill in the blanks in each of the following statements:**

a) Java\_\_ is a platform independent programming language that was built with the objective of allowing programs to be written once and then run on a large variety of electronic devices without modification.

b) Java Standard Edition (SE), Java Enterprise Edition (EE), and Java Micro Editon (ME)\_\_ are the names of the three editions of Java that can be used to build different kinds of applications.

c) \_\_is the information-carrying capacity of communication lines, and has rapidly increased over the years and become more affordable. Its availability is a cornerstone for building applications that are significantly connected.

d) A(n) assembler\_\_ is a translator that can convert early assembly-language programs to ma chine language with reasonable efficiency.

**1.6 Fill in the blanks in each of the following statements:**

a) Java programs normally go through five phases— Edit, Compile, Load, Verify and Execute.

b) A(n) Integrated Development Environments (IDEs)\_\_ provides many tools that support the software development process, such as editors for writing and editing programs, debuggers for locating logic errors in programs, and many other features.

c) The command java invokes the\_\_Javac , which executes Java programs.

d) A(n) Virtual Machine\_\_is a software application that simulates a computer, but hides the un derlying operating system and hardware from the programs that interact with it.

e) The Class Loader\_\_ takes the .class files containing the program’s bytecodes and transfers them to primary memory.

f) The Bytecode Verifier\_\_ examines bytecodes to ensure that they’re valid.

1.7. Explain what a just-in-time (JIT) compiler of Java does.

**Attempt;** The just-in-time (JIT) compiler translates bytecodes into computer’s machine language for fast execution by the Java Virtual Machine (JVM).

1.8. One of the world’s most common objects is a wrist watch. Discuss how each of the follow ing terms and concepts applies to the notion of a watch: object, attributes, behaviors, class, inheri tance (consider, for example, an alarm clock), modeling, messages, encapsulation, interface and information hiding.

**Attempt;**

**Object of a watch:** Drawing of the watch which explains the features of the watch as proposed in the blue-print.

**Attribute:** The lively features of the watch such as the colour of the watch, the style of the handle, buttons, the edges, the screen.

**Class:** This involves object-oriented programming that hides the features of the watch, such as the batteries, engines,the panels, from the users.

**Message:** By pressing the buttons, you send message to the object on the need for reset. This message is implemented as a method call, which tells the method of the object to perform task.

**Inheritance:** The object class of the watch is smart display for internet accessibility.

**Encapsulation and information hiding:** Hidden smart displays afterwards in other classes.

**Interface:** The continuous movement to tell minutes, seconds, hours, as well as alarms.

**Modeling:** The lightening of the screen for better view, AI speech enhancement, mini-camera, biometric verification.

**Bahaviour:** The display of seven segment designs, receiving of messages and notifications, voice recording, scrolling features in pages, automatic activation of backlights, charging feature of the battery, percentage display of battery health, and running of java applications.

1. **Java compilation** is the process in which java source-code (java program) is converted to bytecode that is readable by machine, for execution by the Java Virtual Machine (JVM).
2. **Java Development Kits (JDK)** are tools that enables a software developer to create, compile and run java applications. While Java Runtime Environment (JRE) is a software environment that provides the necessary resources such as the Java Virtual Machine (JVM) for the interpretation and execution of byte-code.
3. Compilers are needed to convert high-level language to machine language which can be understood by computers for further processing. In other words, compilers are translator programs that converts instructions that looks like everyday English, that may contain commonly used mathematical notations.

SUMMARY

Java is an object-oriented programming (OOP) language that enables the creation and execution of applications with the aid of tools known as Java Development Kits (JDK), inline with the JRE. Java applications are meant to run in computers with software such as the JDK. Programmers write instructions to the computer in different languages such as the machine languages, assembly languages and high-level languages. The assembly language and high-level languages are not understood by computers. As such, there is need for intermediate translation to machine languages which is understood by computers. Computers understand binary codes as its only language (machine languages), which is a series of 0s and 1s.

Computers systems take instructions from the users and processes them sequentially through the various units (input units, output units, memory units, Central Processing Units, Arithmetic and Logic units and the Secondary storage units). Many operating systems support java programs as it enables simplicity in various operations, coupled with the existence of internet of things (IoT). It is used in vehicles, phones, watches, TV, meters, etc.

The present of microprocessors have made room for the advancement of Object-Oriented Programming (OOP) and it significantly affected the cost of computers in the market, as stated in the Moore's law. Microprocessors help provide the storage environment for software engineers to perform their activities, coupled with the Internet of Things.

Java programs follows a series of pathway in its creation, compiling and executions. Thisq includes; Edit, Compile, Load, Verify and Execute.

The execution of java programs is only possible in the presence of the Java Virtual Machine (JVM) which inline with the just-in-time (JIT) program translate source-code into a code that is understood by machines (bytecode) for execution. The Java Runtime Environment (JRE) provides the necessary resources for the process to be carried out with alteration, provided no error is detected by the bytecode verifier.

Java programs are entitled at least a class, instance variable and method(s), depending of the intensity of the application an individual maybe be dealing with.

In parallel with the early evolution of the Internet, organizations worldwide were implementing their own networks for both intraorganization and interorganization communication. Businesses rapidly realized that by using the Internet, they could improve their operations and offer new and better services to their clients. Companies started spending large amounts of money to develop and enhance their Internet presence. This generated fierce competition among communications carriers and hardware and software suppliers to meet the increased infrastructure demand. As a result, the information-carrying capacity of communications lines on the Internet has increased tremendously, while hardware costs have plummeted.