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## **Session 4**

**#TASK1:** Why are apple processors better and how could the rest be better?

### **Sol**

Because the M1 in apple is not a CPU, it is a whole system of multiple chips put into one large silicon package. The CPU is just one of these chips.

Basically, the M1 is one whole computer onto a chip. The M1 contains a CPU, graphical processing unit (GPU), memory, input and output controllers, and many more things making up a whole computer. This is what we call a system on a chip (SoC).

Also, to avoid the problems of heat in INTEL or AMD apple do these things:

1. There is no special area reserved just for the CPU or just the GPU. Memory is allocated to both processors. They can both use the same memory. This means that no copying is needed and so things go faster.
2. Apple uses memory, which is designed to serve both large chunks of data and do it very quickly. It is called 'low latency and high throughput'. This

removes the need to have two different types of memory and all the copying of data between them, making the M1 faster.

3. With their iPhone and iPad design experience, Apple has been able to get the GPU power consumption down so that a relatively powerful GPU can be integrated into an SoC without overheating.

**#TASK2:** The difference between each processor and the characteristics of them?

**Sol**

**#TASK3:** What is tabulation and memoization?

**Sol**

\_tabulation is Tabulation is defined as the process of placing classified data in tabular form. A table is a systematic arrangement of static information in rows and columns. The rows of a table are the horizontal arrangement of data whereas the columns of a table are the vertical arrangement of data.

\_memoization is an optimization technique used primarily to speed up computer programs by storing the results of expensive function calls and returning the cached result when the same inputs occur again. Memoization has also been used in other contexts (and for purposes other than speed gains), such as in simple mutually recursive descent parsing. Although

related to caching, memoization refers to a specific case of this optimization, distinguishing it from forms of caching such as buffering or page replacement

**#TASK4:** What is linear probing?

**Sol**

Linear probing is a scheme in computer programming for resolving collisions in hash tables, data structures for maintaining a collection of key–value pairs and looking up the value associated with a given key. It was invented in 1954 by Gene Amdahl, Elaine M. McGraw, and Arthur Samuel and first analyzed in 1963 by Donald Knuth.

**#TASK5:** video Mostafa saad about hash tables  
DONE

**#TASK6:** what is dynamic memory allocation?

**Sol**

Dynamic Memory Allocation: The mechanism by which storage/memory/cells can be allocated to variables during the run time is called Dynamic Memory Allocation (not to be confused with DMA). So, as we have been going through it all, we can tell that it allocates the memory during the run time which enables us to use as much storage as we want, without worrying about any wastage.

Also, Dynamic memory allocation is the process of assigning the memory space during the execution time or the run time.

**#TASK7:** All c++ frame works

**Sol**

*C++ generic frameworks and libraries.*

- Apache C++ Standard Library - A collection of algorithms, containers, iterators, and other fundamental components. [Apache2]
- APR - Apache Portable Runtime. Another library of cross-platform utility functions. [Apache2]
- ASL - Adobe Source Libraries provides peer-reviewed and portable C++ source libraries. [MIT]
- Boost ⚡ - A large collection of generic C++ libraries. [Boost] website
- BDE - The BDE Development Environment from Bloomberg Labs. [MIT]
- Cinder - A community-developed, free and open source library for professional-quality creative coding. [BSD]
- Cxxomfort - A small, header-only library that backports to C++03 some of the nifty C++11 goodies. [MIT]
- Dlib ⚡ - A general purpose cross-platform C++ library designed using contract programming and modern C++ techniques. [Boost]
- EASTL - Public part of EA-STL. [BSD]

- ffead-cpp - Framework for Enterprise Application Development. [Apache2]
- Folly - An open-source C++ library developed and used at Facebook. [Apache2]
- JUCE - An all-encompassing C++ class library for developing cross-platform software. [Core-Module: ISC, Rest: GPL2/GPL3/Commercial] website
- libPhenom - libPhenom is an eventing framework for building high performance and high scalability systems in C. [Apache2]
- LibSourcey - C++11 evented IO for real-time video streaming and high performance networking applications. [LGPL]
- LibU - A multiplatform utility library written in C. [BSD]
- Loki - A C++ library of designs, containing flexible implementations of common design patterns and idioms. [MIT]
- MiLi - Minimal headers-only C++ Library. [Boost]
- OpenFrameworks - A cross platform open source toolkit for creative coding in C++. [MIT] website
- Qt ⚡ - A cross-platform application and UI framework. [LGPL]
- Reason - A cross platform framework designed to bring the ease of use of Java, .Net, or Python to developers who require the performance and strength of C++. [GPL2]
- ROOT - A set of OO frameworks with all the functionality needed to handle and analyze large

amounts of data in a very efficient way. Used at CERN. [LGPL]

- STLport - An exemplary version of STL. [Free]
- STXXL - Standard Template Library for Extra Large Data Sets. [Boost]
- Ultimate++ - A C++ cross-platform rapid application development framework. [BSD]
- uSTL - The small STL library. [MIT]
- Windows Template Library - A C++ library for developing Windows applications and UI components. [Public]
- Yomm11 - Open multi-methods for C++11. [Boost]

**#TASK8:** What are web services, micro-services and APIs?

## Sol

\_A web service is any piece of software that makes itself available over the internet and uses a standardized XML messaging system. XML is used to encode all communications to a web service. For example, a client invokes a web service by sending an XML message, then waits for a corresponding XML response. As all communication is in XML, web services are not tied to any one operating system or programming language—Java can talk with Perl; Windows applications can talk with Unix applications.

\_A micro-service is an architectural style that structures an application as a collection of services that are

- Highly maintainable and testable

- Loosely coupled
- Independently deployable
- Organized around business capabilities
- Owned by a small team

The microservice architecture enables the rapid, frequent and reliable delivery of large, complex applications. It also enables an organization to evolve its technology stack.

\_ An API is a set of programming code that enables data transmission between one software product and another. It also contains the terms of this data exchange.

**#TASK9:** how to write a multiple line code with different programming languages in the same program?

**Sol**

**#TASK10:** what is cronjobs?

**Sol**

Cron is a time-based job scheduler in Unix or Unix-like computer operating systems. You can use Cron to schedule jobs, i.e., to execute commands or shell scripts at specified times, dates, or intervals. This allows you, for example, to automate system maintenance or management, to download files from the internet, or to send emails on a regular basis. It is a daemon, i.e. a

background process that always runs on the server. The tasks Cron is supposed to perform are called Cronjobs. Originally, the name Cron comes from the Greek god of time "Chronos".

e.g., for cleaning up databases by removing obsolete entries, log files, and comments, or for creating regular statistics on the number of users of a website.

**#TASK11:** Why set is the fastest data structure?

**Sol**