Session 3

1. Why are apple processors better and how could we improve the other processors?

- Apple Silicon chips are RISC chips, while Intel chips are CISC chips. The comparison is not Apple vs Intel, but RISC vs CISC. "RISC" is "reduced instruction set computing," and "CISC" is "complex instruction computing."

  CISC chips, such as Intel and AMD, have a large number of instructions, of varying length, and some are rarely used. The CISC chip has the overhead of determining whether it has the entire instruction. CISC chips acquire cruft over the years, which slows them down. Since the instruction set is complicated, the chip is more complex and therefore slower in comparison to an equally powerful RISC chip.

  RISC chips, such as Apple Silicon and ARM, have fewer instructions, and all of them have the same length, so there is no overhead in determining whether the chip has the entire instruction. Since the instruction set is simple, the chip is simpler and therefore faster.

- The difference is that Apple holds an architectural license with Arm, which allows it to design its own chips from scratch. Apple's first in-house 64-bit Arm processor was the Apple A7 which was used in the iPhone 5S. It had a dual-core CPU, clocked at 1.4 GHz, and a quad-core PowerVR G6430 GPU. It was manufactured using a 28nm process.

2. What is tabulation and memoization?

Tabulation: Bottom Up
Memoization: Top Down

	Tabulation	Memoization
State	State Transition relation is difficult to think	State transition relation is easy to think
Code	Code gets complicated when lot of conditions are required	Code is easy and less complicated
Speed	Fast, as we directly access previous states from the table	Slow due to lot of recursive calls and return statements
Subproblem solving	If all subproblems must be solved at least once, a bottom-up dynamic-programming algorithm usually outperforms a top-down memoized algorithm by a constant factor	If some subproblems in the subproblem space need not be solved at all, the memoized solution has the advantage of solving only those subproblems that are definitely required
Table Entries	In Tabulated version, starting from the first entry, all entries are filled one by one	Unlike the Tabulated version, all entries of the lookup table are not necessarily filled in Memoized version. The table is filled on demand.

3. What is linear probing?

A hash table in which a collision is resolved by putting the item in the next empty place in the array following the occupied place

4. What is dynamic memory allocation and how to make it?

We can dynamically allocate storage space while the program is running, but we cannot create new variable names "on the fly"

For this reason, dynamic allocation requires two steps:

Creating the dynamic space.

Storing its address in a pointer (so that the space can be accesed)

To dynamically allocate memory in C++, we use the new operator.

De-allocation:

Deallocation is the "clean-up" of space being used for variables or other data storage

Compile time variables are automatically deallocated based on their known extent (this is the same as scope for "automatic" variables)

It is the programmer's job to deallocate dynamically created space

To de-allocate dynamic memory, we use the delete operator

static memory allocation	**dynamic memory allocation**
memory is allocated at compile time.	memory is allocated at run time.
memory can't be increased while executing program.	memory can be increased while executing program.
used in array.	used in linked list.

5. All c++ frameworks in all tracks.

https://github.com/Thesnak/awesome-cpp

6. What is web services, micro-services and APIs?

API is the acronym for Application Programming Interface, which is a software intermediary that allows two applications to talk to each other.
How API works?
When you use an application on your mobile phone, the application connects to the Internet and sends data to a server. The server then retrieves that data, interprets it, performs the necessary actions and sends it back to your phone. The application then interprets that data and presents you with the information you wanted in a readable way.

A web service, in contrast to an API, functions more like a resource that's available using the internet. The network-based resource can be applied to specific tasks, but they require a network to function. This means that all web services are APIs, but only some APIs are web services.
A web service works by supporting interoperable machine-to-machine communication using a network. As such, web services tend to be connected with SOA or Service Oriented Architecture. This allows for different features to be separated then made available as various services within a network.

Microservices are architectural styles typically used in modern web apps that require more fragmented functionality. That means that each service is a modular, unique process that can be deployed independently. The lightweight architecture still makes use of SOA and can be especially advantageous for larger companies.

7. how to write a multiple line code with different programming languages in the same program?

https://foojay.io/today/java-panama-polyglot-part1/

8. All about cronjobs with examples

cron job is a Linux command used for scheduling tasks to be executed sometime in the future. This is normally used to schedule a job that is executed periodically – for example, to send out a notice every morning.

9. comparison between core i7 and i9 in the performance of the same task

https://cpu.userbenchmark.com/Compare/Intel-Core-i9-12900KS-vs-Intel-Core-i7-12700K/m1821519vs4119

10. Why set is the fastest data structure?

Because it used in hash table