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DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

19ECT312 – EMBEDDED SYSTEM DESIGN

III YEAR/ VI SEMESTER

UNIT 3 : PROGRAMMING CONCEPTS AND EMBEDDED PROGRAMMING IN C++

TOPIC 3.3 Embedded Programming in C++

Embedded Programming in C++

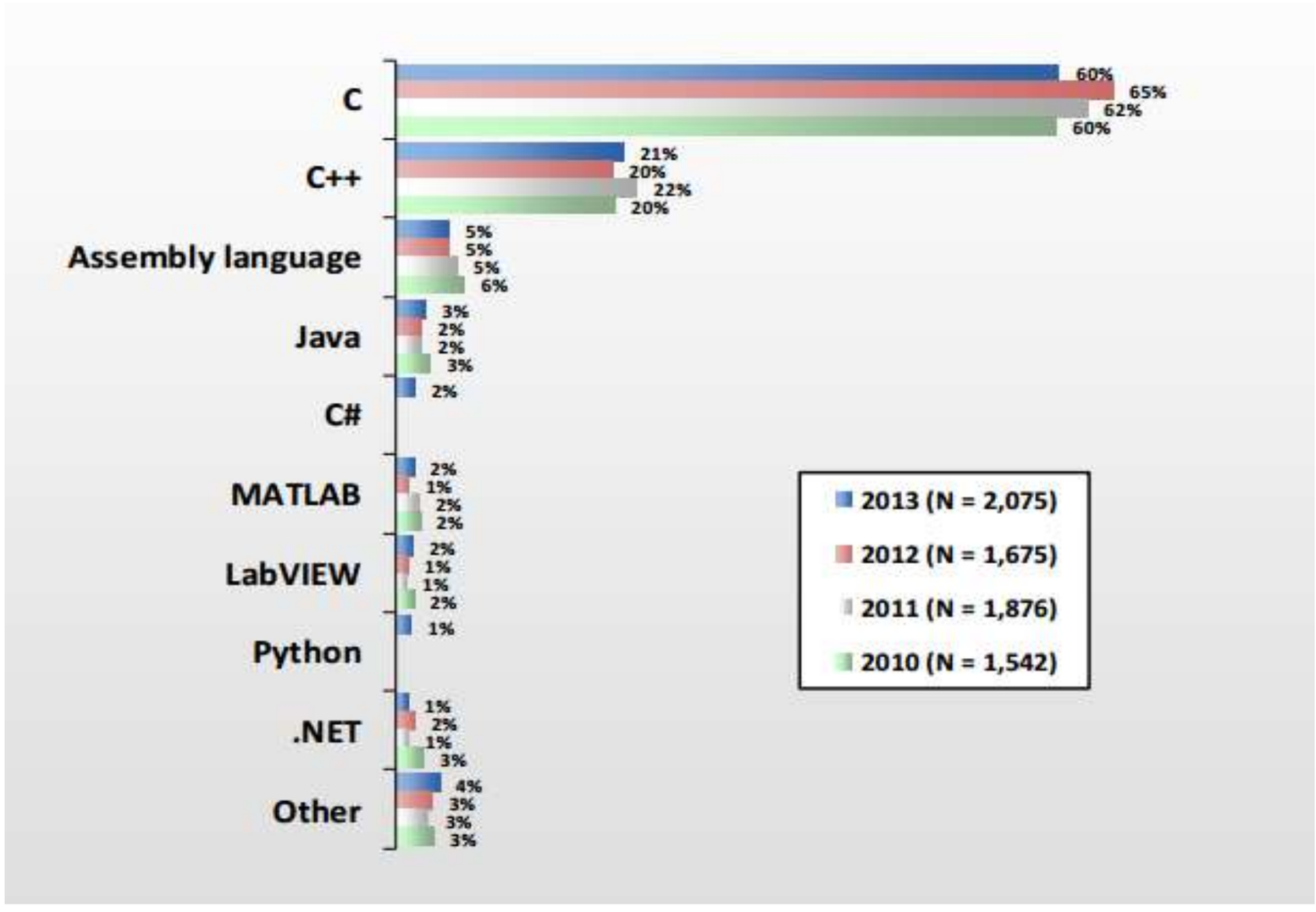
- Embedded C++ Embedded C++ (EC++) is a dialect of the C++ programming language for embedded systems

- C++ was created as an extension of C and it is just as fast and powerful coupled with modern improvements that make it more desirable to veteran developers

- Its namespace feature prevents naming conflicts, boasts the ability to overload constructors and functions, works with templates, etc.

- C++ has many features that are typically lacking in C e.g. developers can use inline functions instead of macro definitions. It is also more beginner friendly than its processor

Programming Languages for Embedded Systems



Embedded C++

- Embedded C++ is a descendant of C++ specifically designed for embedded systems programming as it addresses the shortcomings that C++ has in embedded applications

- It was created as a result of the collaboration of major CPU manufacturers e.g. Hitachi, Toshiba, and Fujitsu to include only the aspects of C++ that are vital to embedded systems and omits features like namespaces, multiple inheritances, exception handling, etc.

What is Embedded C++ ?

- Embedded C++ is a dialect of C++ that engineers developed in the late 1990s for embedded systems
- Embedded engineers seldom use the language anymore
- They do use C++ in embedded systems a lot

Difference between embedded C++ and C++

- Embedded engineers developed "embedded C++" for embedded systems with as low as 4kB of RAM memory and a microcontroller processor

- The language tried to keep valuable C++ concepts while removing features that increased memory requirements and reduced the processor's efficiency.

Features of embedded C++

➢Embedded C++ attempted to keep the most helpful aspects of C++ for embedded systems while eliminating those that caused undeterministic CPU cycles or boosted memory requirements

➢ Embedded C++, for instance, retained how C++ uses classes as a blueprint to create objects for object-oriented programming

➢However, embedded C++ removed features that embedded engineers use today

➢Those elements include multiple inheritance, templates, exceptions, virtual base classes, and runtime type identification

Why C++ is good for embedded systems

- C++ works well for embedded programming because it sits close to the system hardware

- C++ has pretty much everything that C does, but much more: an array of higher-level language features, including object-oriented programming and type-safe cast that helps to avoid unpleasant memory access errors

Advantages of C++ for embedded systems

1. Ease of use
2. Portability
3. Stability
4. Gateway language
5. Support
6. Good for GUIs

Disadvantages of C++ for embedded systems

1. Hard to learn
2. Codebase obstacles
3. Potential performance issues
4. Memory management challenges