

C PROGRAMMING FIRST SESSION QUIZ

QUESTIONS

- 1) What is the compiler?
- 2) What is meant by native compiler and cross compiler?
- 3) What are the steps of compiling? Illustrate the steps as much as you can.
- 4) Explain briefly preprocessor?
- 5) What is meant by libraries?
- 6) Why using 'C' language specifically with embedded systems?
- 7) What will be the output of the following code:

```
Include <stdio.h>
Int main ()
{
    printf("hello world");
return 0;
}
```

ANSWERS

- 1) Compiler is simply a translator that translates the 'C' language or any language to the targeted machine code.

Example: c language compiled to work on Atmel AVR so that means 'C' translated to Atmel AVR assembly then converted to obj file and finally hex file that is flashed to the microcontroller.

Compiling a code is consisting of steps.

- 2) Native compiler: is the compiler that is compiling the current code to the current machine code to work "only" on the current machine and no other machine
Cross compiler: means that this compiler will compile the code to work on another machine like in case of writing code to work on other microcontroller.

- 3) preprocessing

The first stage of compilation is called preprocessing. In this stage, lines starting with a # character are interpreted by the preprocessor as preprocessor commands. These commands form a simple macro language with its own syntax and semantics.

compilation

The second stage of compilation is confusingly enough called compilation. In this stage, the preprocessed code is translated to assembly instructions specific to the target processor architecture. These form an intermediate human readable language.

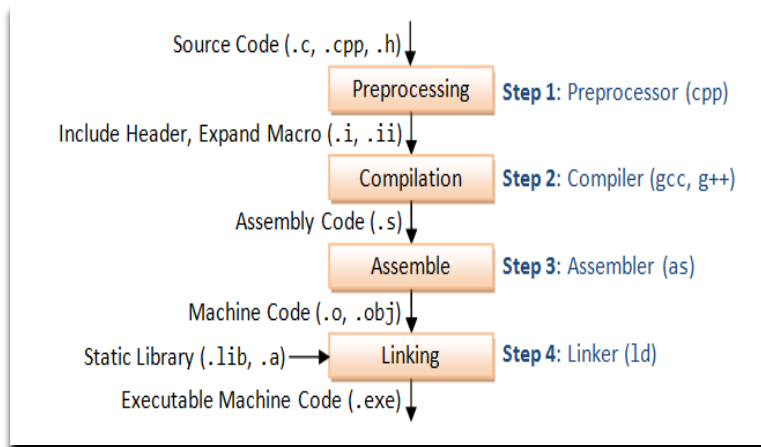
Assembly

During the assembly stage, an assembler is used to translate the assembly instructions to machine code, or object code. The output consists of actual instructions to be run by the target processor.

linking

The object code generated in the assembly stage is composed of machine instructions that the processor understands but some pieces of the program are out of order or missing. To produce an executable program, the existing pieces have to be rearranged and the missing ones filled in. This process is called linking.

The linker will arrange the pieces of object code so that functions in some pieces can successfully call functions in other pieces. It will also add pieces containing the instructions for library functions used by the program



4) preprocessing

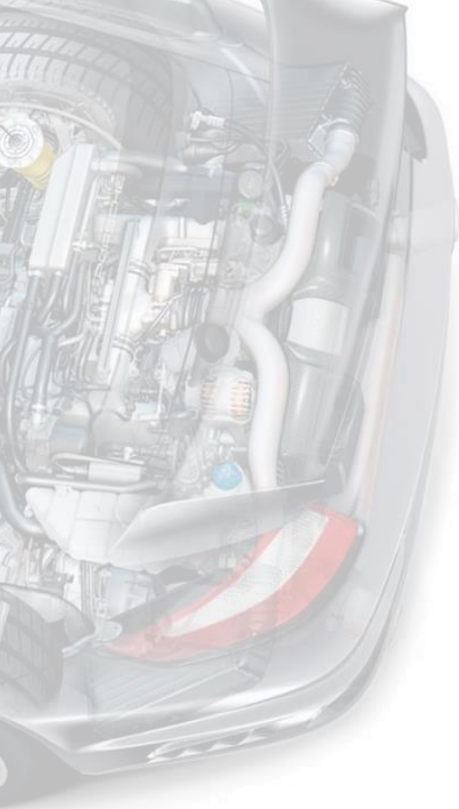
The first stage of compilation is called preprocessing. In this stage, lines starting with a # character are interpreted by the preprocessor as preprocessor commands. These commands form a simple macro language with its own syntax and semantics.

- 5) A library in C is a group of functions and declarations, exposed for use by other programs. The library therefore consists of an interface expressed in a .h file (named the "header") and an implementation expressed in a .c file. This .c file might be precompiled or otherwise inaccessible, or it might be available to the programmer. (Note: Libraries may call functions in other libraries such as the Standard C or math libraries to do various tasks.)

- 6) "C" language is powerful it has the ability to access memory directly using pointers

Secondly is that "C" is portable and have many compilers that translates the "C" to other machines: microcontrollers assembly.

- 7) The code will not run as the "#" is missing from the code



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