Intermediate Task

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1. The preprocessor directives in c is some instruction that is performed before the compiling stage. They all start with # . There are different types of preprocessors such as (file inclusion – conditionals) for example the #include used to include header files either stander like "stdio.h" or the user header files . An example for condition is #if we can use it to check if certain conditions is defined before executing our code. #define is also a commonly used in embedded c. its used to define macros with or without arguments (works similar to functions)

2. The volatile keyword is used to define a variable that will change through the program so each time a command is done with the processor should fetch it again from the processor rather than storing its first value in a register. I think it has more functionality than that but that all I know and could understand from some sources on the internet

3. There are four compilation stages :
    - The preprocessing stage : the compiler strips the code from comment and expand macros and included files and conditionals compilation
    - The compiling stage : the code get to assembly level so the assembler can understand
    - The assembler : translate assembly code to machine code with machine level instructions
    - Linking : this stage links all function calls together . it adds some extra code to our program which is required when the program starts and ends.

4. During the compiling phase the errors detected is syntax mistakes. The linker phase the nature of errors will be structs, classes or global variables

5. The loop unrolling helps increases program speed but it make the code size bigger and increases the use of registers in a single iteration