WEB/CWEB

Julian Lang

Outline

Literate Programming

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Donald E. Knuth:

"I am enormously biased about Literate Programming, which is surely the greatest thing since sliced bread."

Design of WEB

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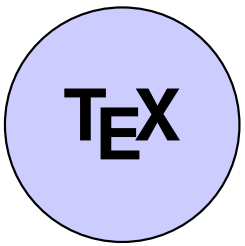

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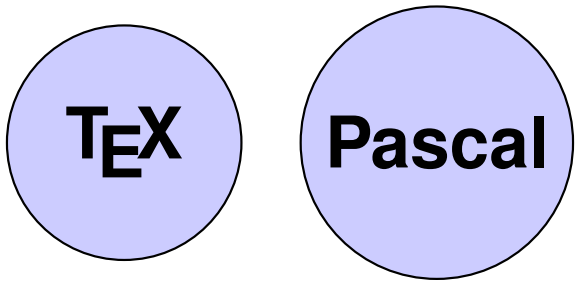

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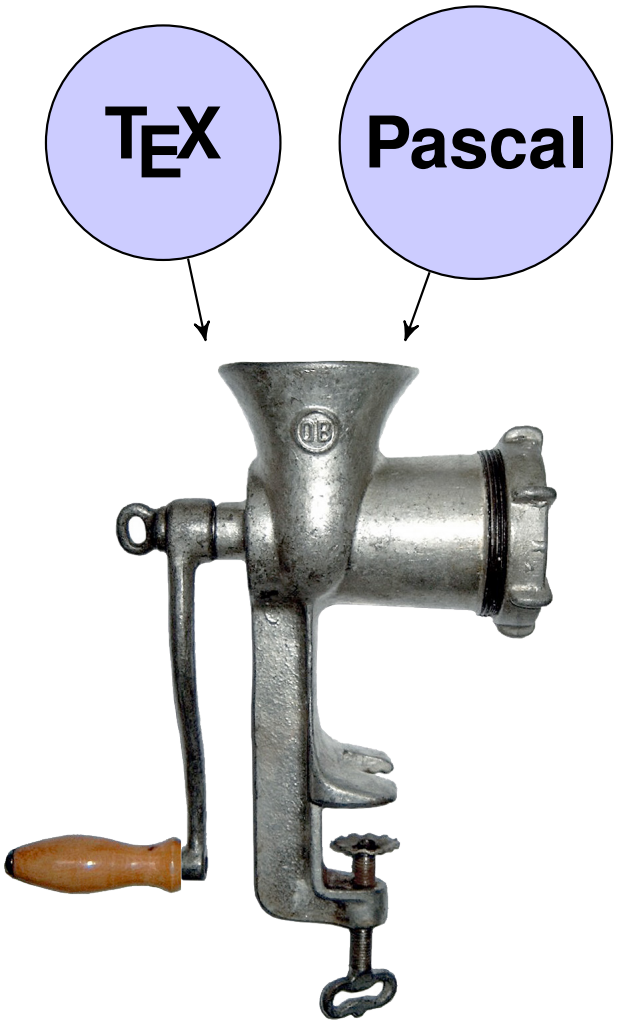

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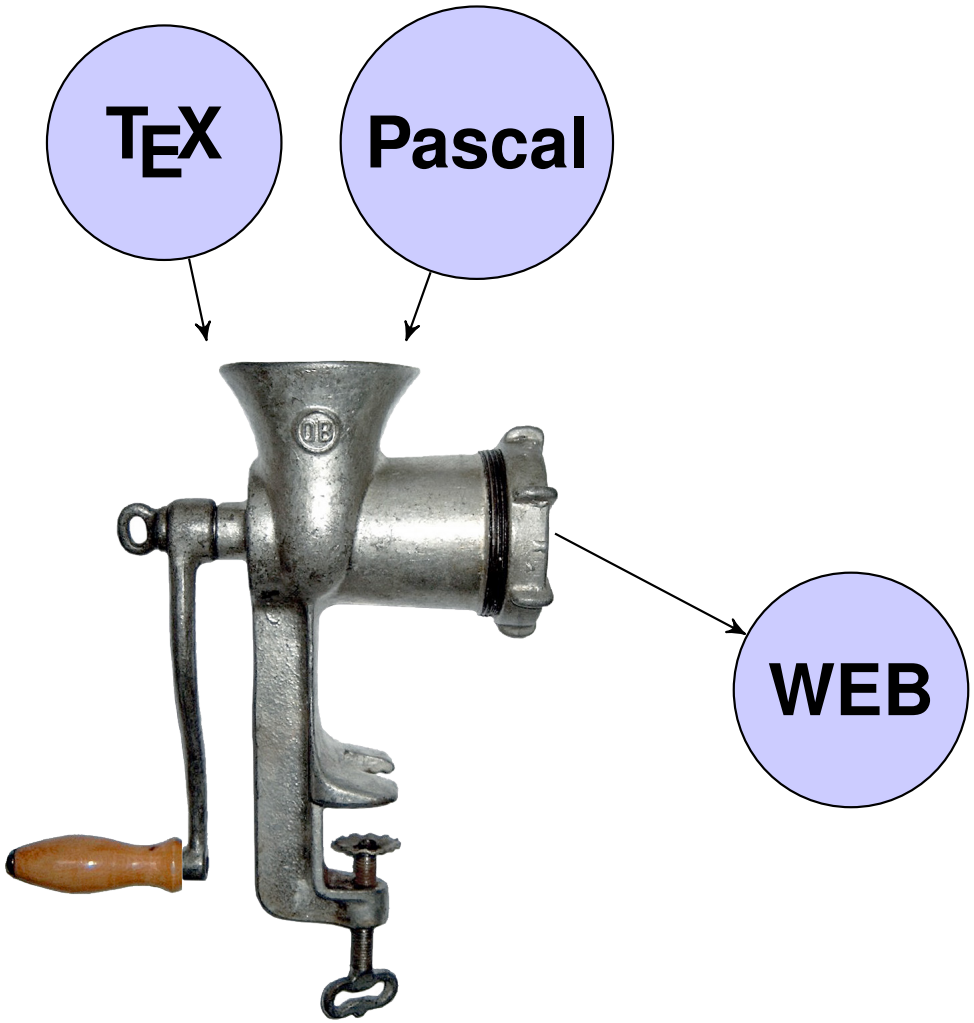

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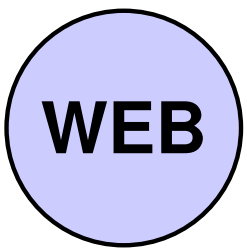
- WEB uses Pascal to write the code and TEX to document it.
- WEB was invented to help people to write better programs and to get a better documentation.
- The famous programs TEX and Metafont are written in WEB.

The compilation of a WEB file



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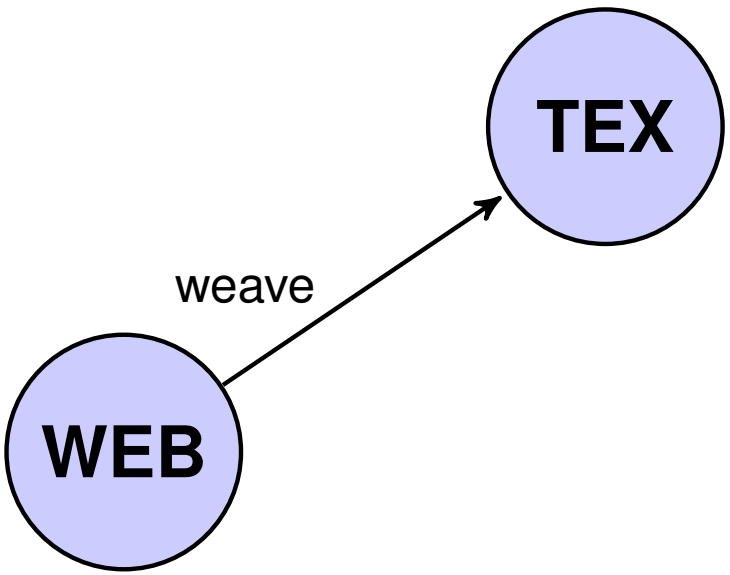

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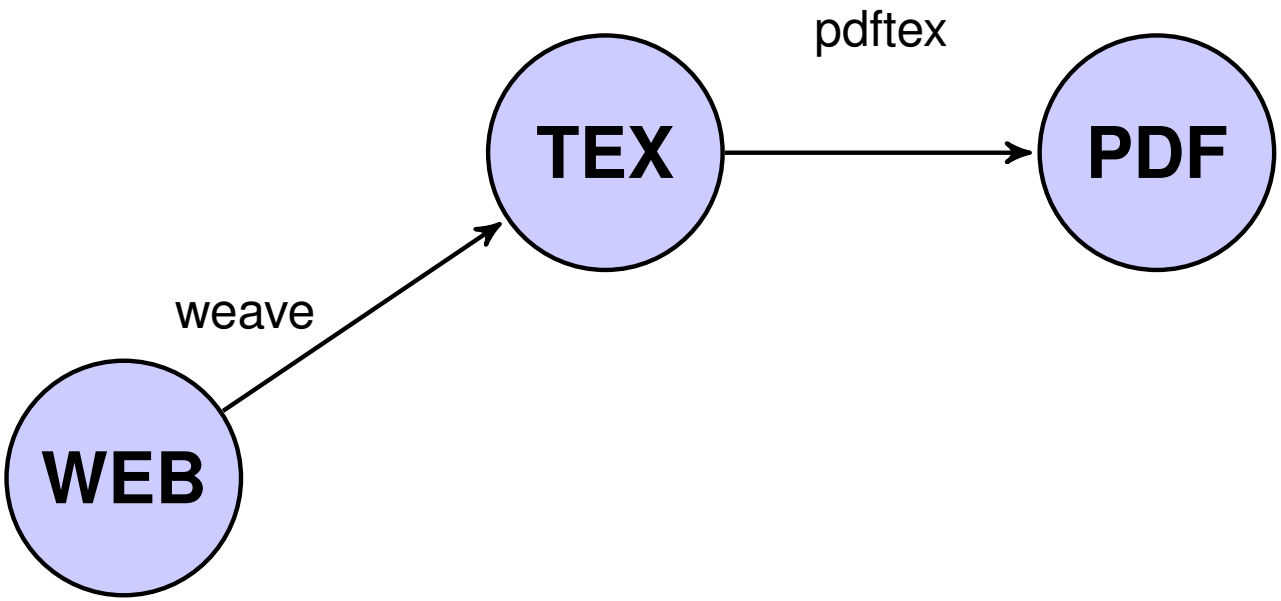

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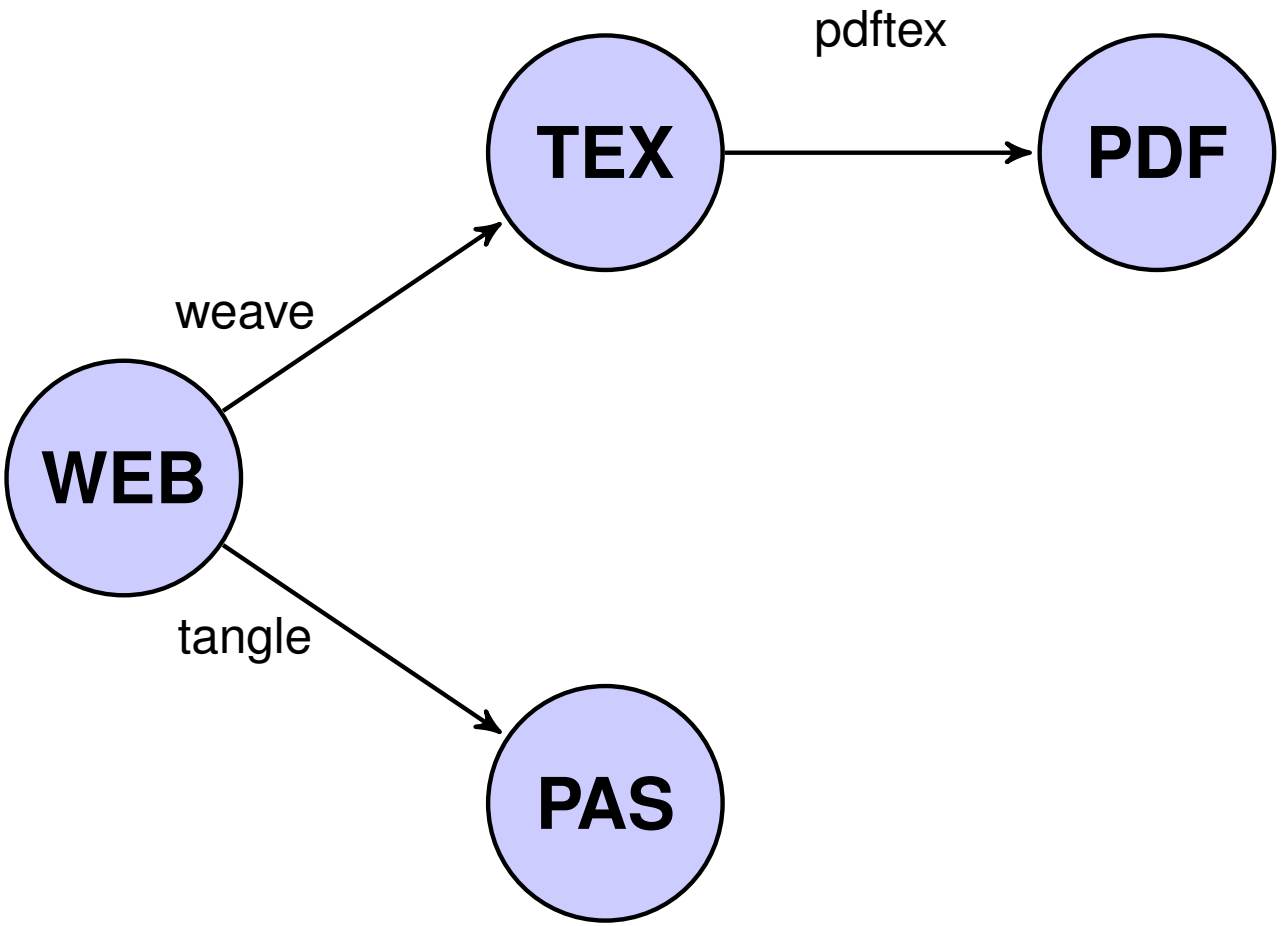

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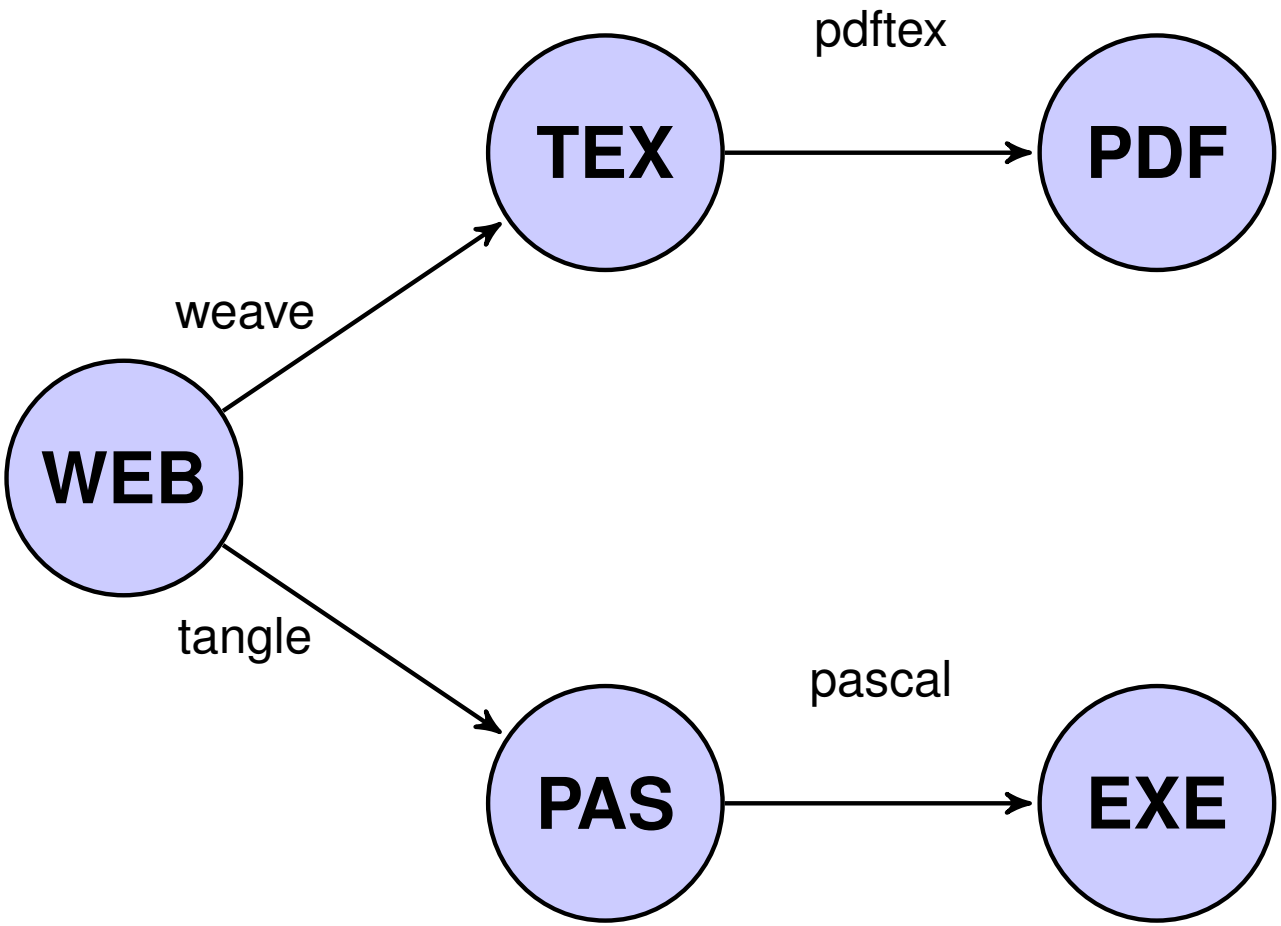

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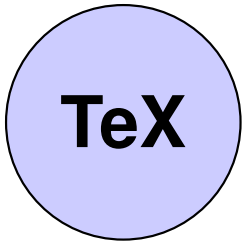

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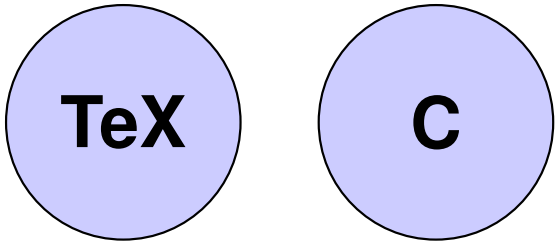

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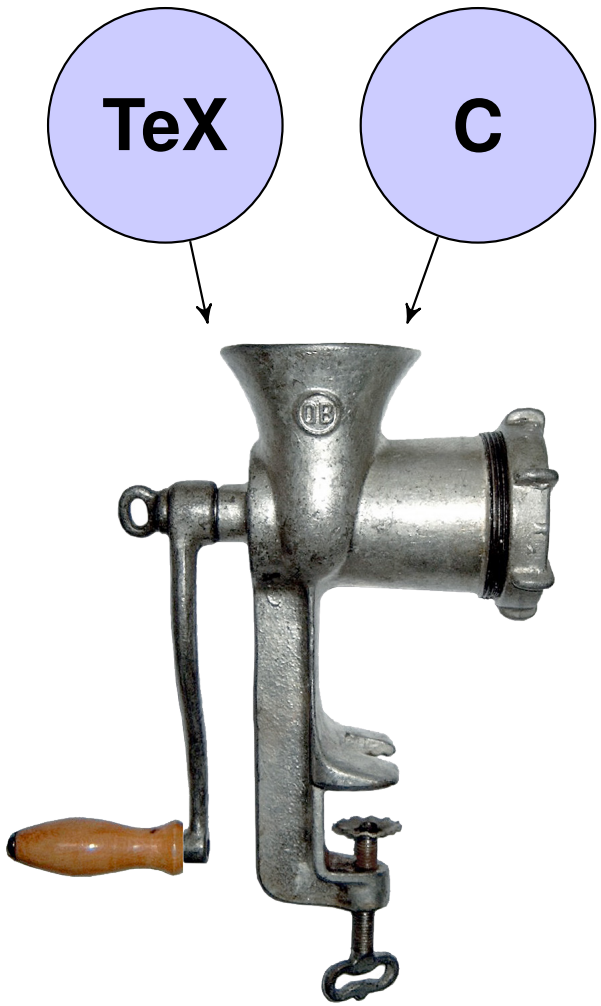

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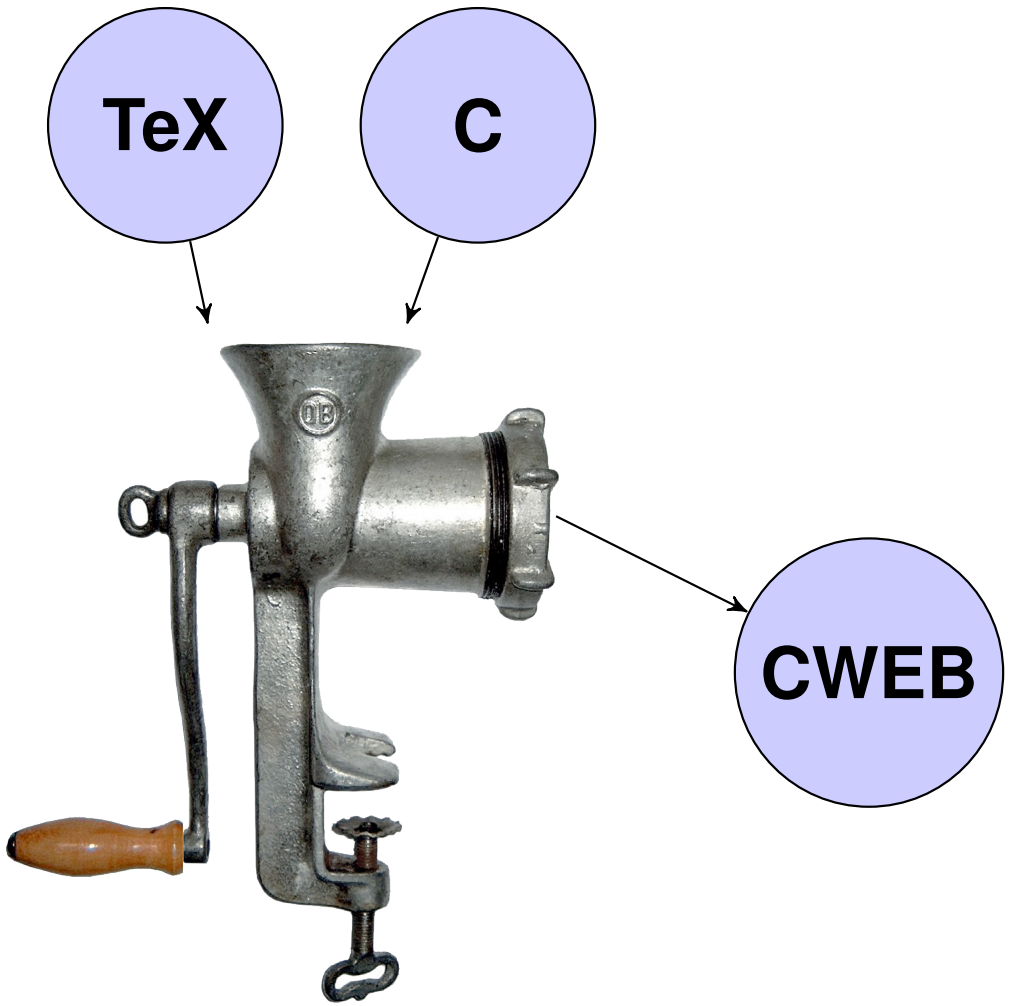

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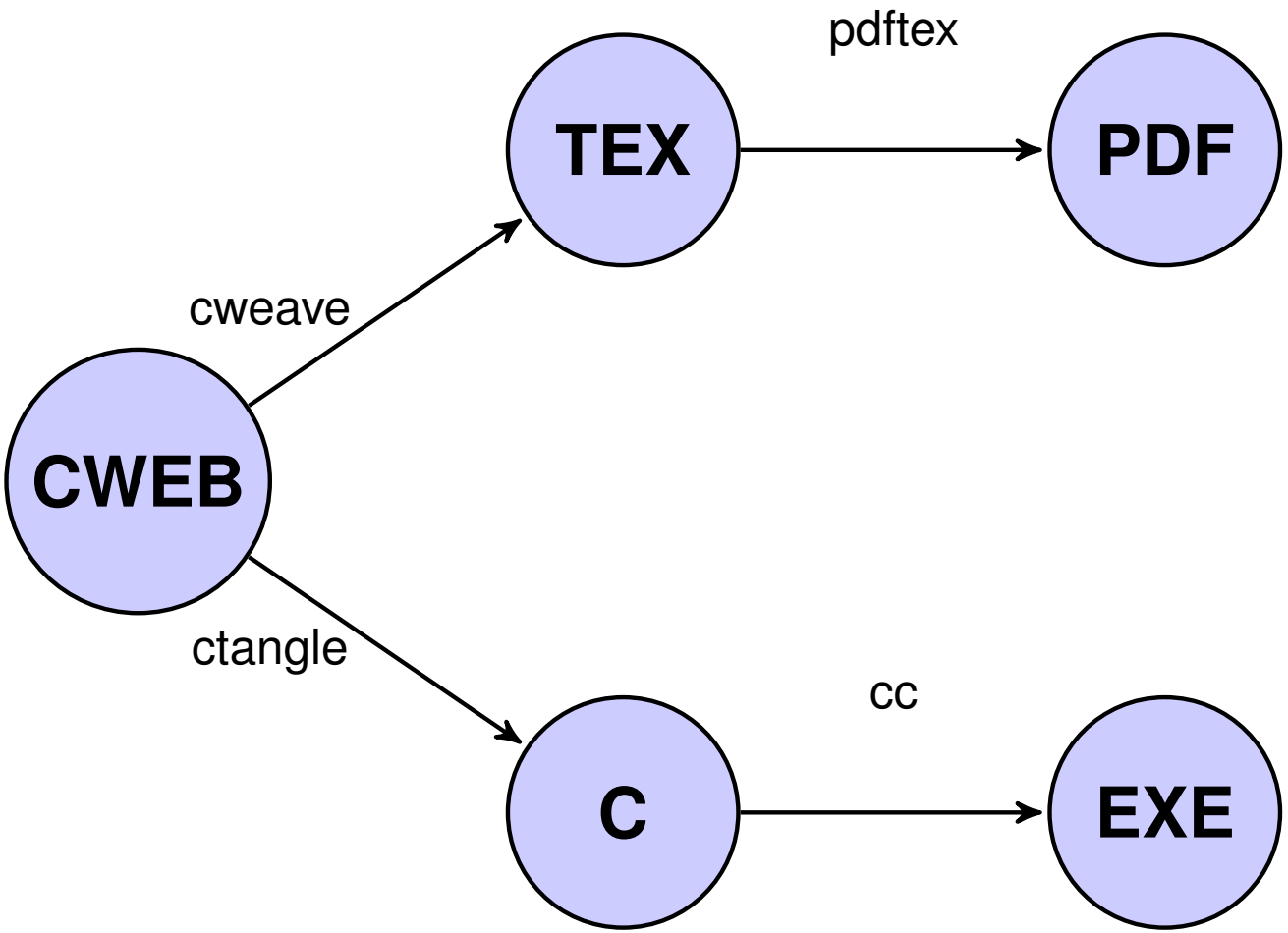

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- CWEB uses C instead of Pascal as the programming language.
- It has almost the same syntax as WEB.
- Is used more frequently than WEB.

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- An unnamed section with the char sequence "@␣".
- A named section begins with the char sequence "@*Name.".

Example of a section

```
@
This is a example section
@c
int main();
```

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Example

```
@
This is the declaration of the main function
@c
int main(int argc,char** argv){
@<Main...@>;
}
@
This is the code of the main function
@<Main function Code@>=
printf("Hello World");
```

A example of a CWEB documentation

§2 HELLO CWEB OUTPUT 1

1. This is the declaration of the main function

```
int main(int argc, char **argv)
{
  ⟨ Main function Code 2 ⟩;
}
```

2. This is the code of the main function

⟨ Main function Code 2 ⟩ ≡

```
printf("Hello World");
```

This code is used in section 1.

argc: 1.
argv: 1.
main: 1.
printf: 2.

Figure : The document output of a CWEB file

In Limbo section

- The code which is written before the first section starts is called “in Limbo”
- This part will be copied in plaintex to the .tex file that is produced by cweave.
- It can be used to specify special TEX options like the page layout or function definitions.

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The middle part

- The formatting of the keywords can be changed.
- In WEB this part is used to define macros.
- In CWEB the macro function was dropped because C already supports macros.

Formatting

- In the TEX part there is a special mode to easily format C code.
- This code can simply be written between “|”.
- For example “|int x = 2;|”.
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§1 TEST CWEB OUTPUT 1

1. A integer with a value: **int** $x = 2$;
A C function: **extern void** *function*( );
A String: `"Hello this is a Test String"`

```
int math_func( )
{
  calc( );      /* Calculates ∛((n+1)/3) */
}
```

calc: 1.
function: 1.
math_func: 1.
x: 1.

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  - Haskell has a own mode for literate programming.
- Many similar languages or forks of WEB were created.
  - noweb
  - nuweb
  - Funnelweb
  - pyWeb
  - Lp4all
  - ...

99 Bottles of Beer

99 Bottles of Beer

```
\def\title{99 Bottles of Beer}
@
In this part the output of the song is created.
It is simply a output of the text with a specific number of beers.

@<Text of the Song@>=
printf("%d bottles of beer on the wall, %d bottles of beer.\n",bottles,bottles);
printf("Take one down pass it around,%d bottles of beer on the wall.\n\n",bottles-1);

@
In this part the loop of the program is defined. It is a simple for loop
where the number of bottles is initialized and then decrased until
it reaches 1.
@<Loop of the function@>=
int bottles = 99;
for(;bottles>0;bottles--)
{
        @<Text...@>;
}
```

99 Bottles of Beer

99 Bottles of Beer cont.

```
@
The main function of the 99 bottles of beer code which contains the
main structure of the program.
@c
@<Includes@>;
int main(int argc,char** argv)
{
        @<Loop...@>;
        @<Finish of the Song@>;
}

@
This is the finish of the song which is executed when the loop ends.
@<Finish of the Song@>=
printf("1 bottle of beer on the wall, 1 bottle of beer.\n");
printf("Take one down and pass it around, no more bottles of beer on the wall.\n\n");
printf("No more bottles of beer on the wall, no more bottles of beer.\n");
printf("Go to the store and buy some more, 99 bottles of beer on the wall.\n");

@
The includes which are needed to use the |printf| function
@<Includes@>=
#include<stdio.h>
#include<stdlib.h>
```

Thank you for your attention.