

Systems Programming and Computer Architecture

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1 C Programming

1.1 History and Toolchain

C is very fast, offers preprocessing and is close to metal. What you won't find in C are objects, classes, traits, features, methods, interfaces, fancy types, exception handling.

Important 1.1. Most importantly C does not offer memory management, it uses pointers that offer direct access to memory addresses.

Code Example 1.2

```
1  #include <stdio.h>
2
3  int main(int argc, char *argv[])
4  {
5      printf("hello, world\n");
6      return 0;
7  }
```

Definition 1.3. GNU gcc Toolchain:

1.2 Control flow

Code Example 1.4

```
1  if (Boolean expression) Statement_when_true
2      else Statement_when_false
3
4  switch (Integer expression) {
5      case Constant_1: Statement; break;
6      ...
7      default: Statement; break;
8  }
9
10 for (Initial; Test; Increment) Statement
11
12 while (Boolean expression) Statement
13
14 do Statement while (Boolean expression)
15
16 goto Label
17
18 printf()
19
20 return (Expression)
```