C & C++

Compilertricks & IDEs

Precompiler directives

- #define
- #warning
- #error

```c
#include <stdio.h>

#warning Program not yet written.
int main(int argc, char const *argv[])
{
 return 0;
}
```

```
$ clang warning.c
warning.c:3:2: warning: Program not yet
written. [-W#warnings]
#warning Program not yet written.
 ^
1 warning generated.
```

Precompiler directives

- #define
- #warning
- #error

```c
#include <stdio.h>

#warning Program not yet written.
int main(int argc, char const *argv[])
{
 return 0;
}
```

```
$ gcc warning.c
warning.c:3:2: warning: #warning Program not
yet written. [-Wcpp]
 #warning Program not yet written.
  ^
```

Attribute Trickery

- __attribute__((nonnull))
- __attribute__((returns_nonnull))

```
extern void *
          my_memcpy (void *dest,
const void *src, size_t len)

__attribute__((nonnull (1, 2)));
```

```
extern void *
          my_memcpy (void *dest,
const void *src, size_t len)

__attribute__((nonnull));
```

```
extern void *
          mymalloc (size_t len)
__attribute__((returns_nonnull));
```

GCC & Clang

- -Wmissing-declarations (C)
- -Wmissing-prototypes (C, C++)
- -Wextra -Wunused
  - unused functions, parameters, variables, values,
  - empty bodies, sign comparison, …

-Wshadow

```
int main(int argc, char const
*argv[])
{
 for(int var = 0; var < 3; var++)
 {
   int var = 15;
 }
 return 0;
}
```

```
$ clang -Wshadow shadow.c
shadow.c:5:9: warning:
declaration shadows a local
variable [-Wshadow]
    int var = 15;
        ^
shadow.c:3:11: note: previous
declaration is here
  for(int var = 0; var < 3; var+
+)
          ^
1 warning generated.
```

Clang extras

- -Wunreachable-Code
- -Wdocumentation
- -Weverything

-Wunreachable-code

```c
#include <stdio.h>
#define NEVER_TRUE 0
int main(int argc, char const
*argv[])
{
 if(NEVER_TRUE)
   printf("This statement will
   never be reached.\n");

 printf("Returning.\n");
 return 0;
}
```

```
$ clang -Wunreachable-code
unreachable.c
unreachable.c:7:5: warning: will
never be executed [-Wunreachable-
code]
    printf("This statement will
never be reached.\n");
    ^~~~~~
1 warning generated.
```

-Wunreachable-code pt. 2

```
#include <stdio.h>
#define true 1

int other_function(int x);

int main(int argc, char const
*argv[])
{
 int x;
 other_function(x);
 return 0;
}

int other_function(int x)
{
 if (x)
   printf("Brackets are vital.\n”);
   return true;
 printf("Also known as GOTO-Fail.
\n");
}
```

```
clang -Wunreachable-code
goto_fail.c
goto_fail.c:19:3: warning: will
never be executed [-Wunreachable-
code]
  printf("Also known as GOTO-
Fail.\n");
  ^~~~~~
1 warning generated.
```

-Wdocumentation

```c
#include <stdio.h>
#define true 1

int other_function(void);

int main(int argc, char const
*argv[])
{
 other_function();
 return 0;
}

///----
/// stuff
/// @param this description
/// @return
int other_function(void)
{
   return true;
}
```

```
$ clang -Wdocumentation
documentation.c
documentation.c:15:12: warning:
empty paragraph passed to
'@return' command
      [-Wdocumentation]
/// @return
    ~~~~~~~^
untitled_3.c:14:12: warning:
parameter 'this' not found in the
function
      declaration [-
Wdocumentation]
/// @param this description
            ^~~~
2 warnings generated.
```

-Weverything

```
$ clang -Weverything everything.c
everything.c:7:14: warning: unused parameter 'argc' [-Wunused-parameter]
int main(int argc, char const *argv[])
             ^
everything.c:7:32: warning: unused parameter 'argv' [-Wunused-parameter]
int main(int argc, char const *argv[])
                               ^
everything.c:3:9: warning: macro is not used [-Wunused-macros]
#define false 0
        ^
everything.c:18:3: warning: will never be executed [-Wunreachable-code]
    printf("Brackets are important.\n");
    ^~~~~~
4 warnings generated.
```

"Your code should be clean enough to eat off of. So take the time to leave your […] files better than how you found them."

–Mattt Thompson