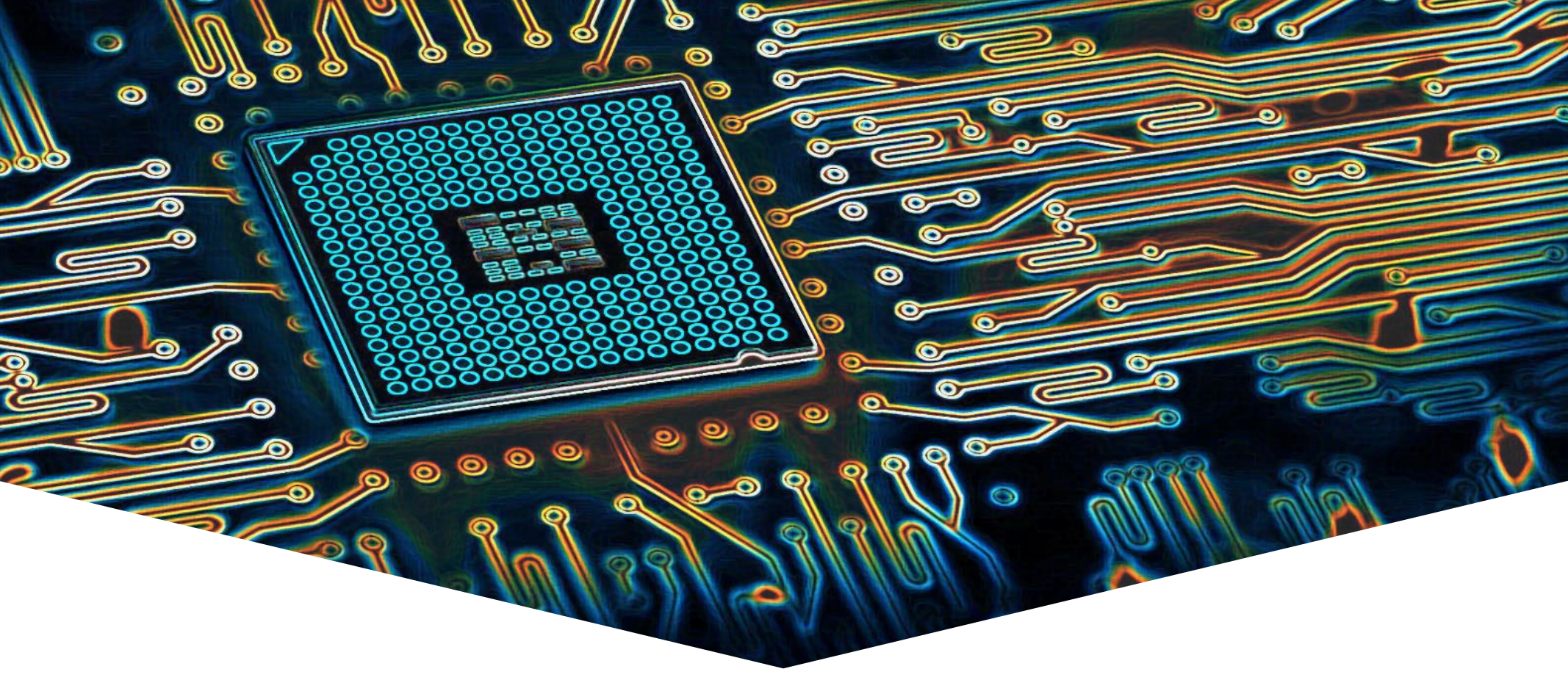

EMS31 Kwartaal 3 Week 6:
Coding standards en static code analysis

Coding standards en static code analysis

Leerdoelen week 3 les 2. Je leert hoe je:

- gebruik kunt maken van verschillende C coding standards;
- gebruik kunt maken van verschillende static code analysis tools, waaronder Cppcheck, om de kwaliteit van je C-code te verbeteren.

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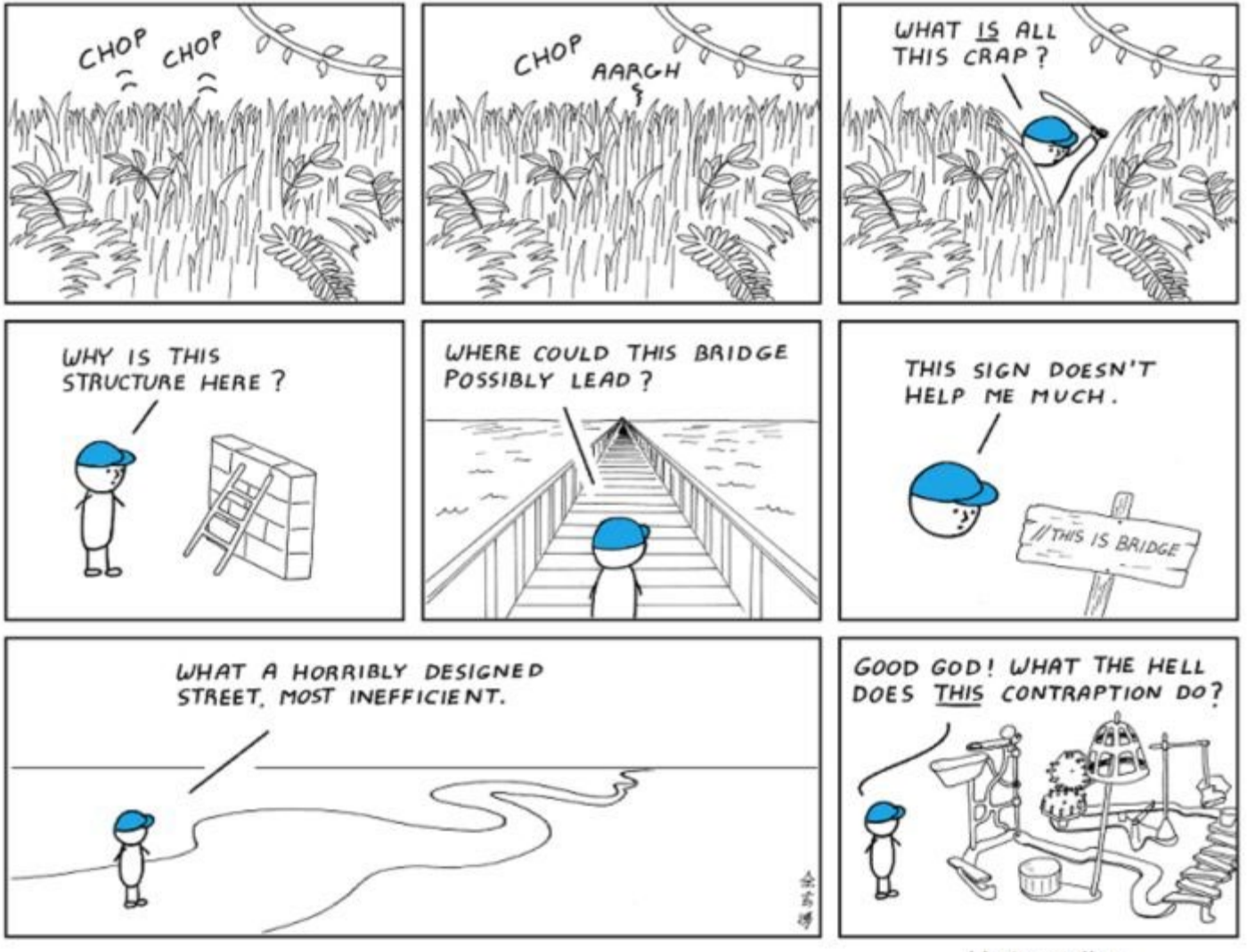

I hate reading other people's code.

Bron: https://zhuanlan.zhihu.com/p/20045208

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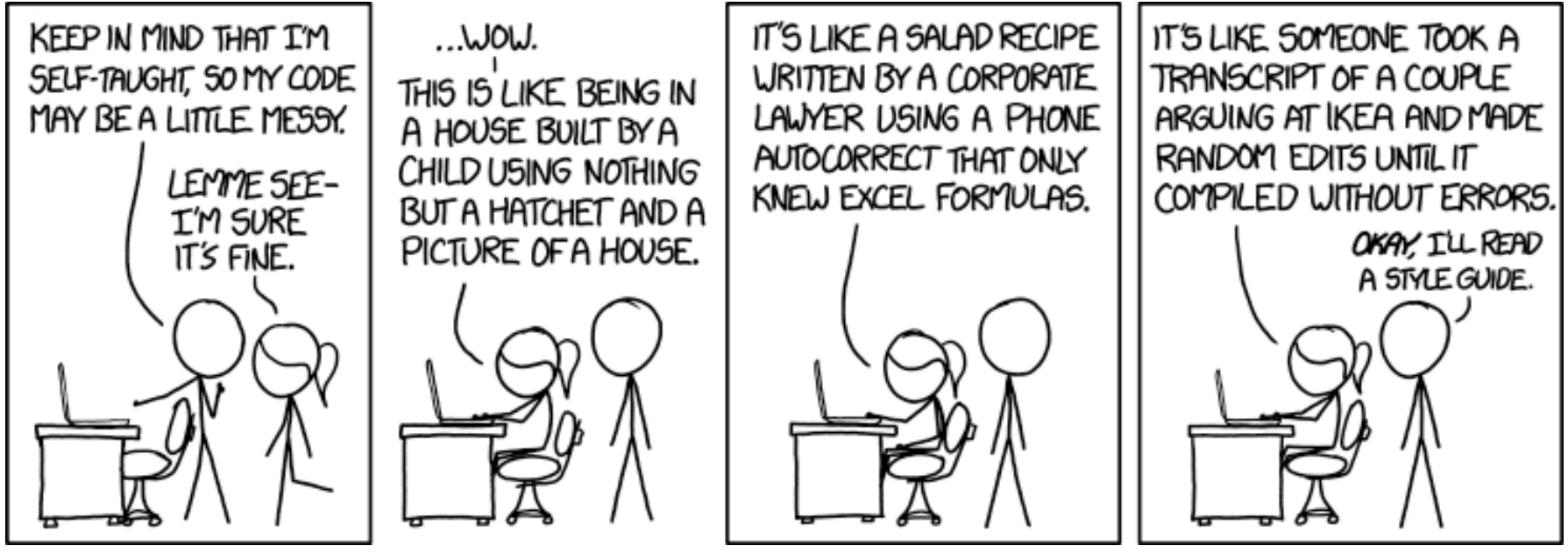
Style guide



Bron: https://xkcd.com/1513/

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Coding standards

Wat is het? Welke coding standards zijn beschikbaar voor **C**?

- MISRA (Motor Industry Software Reliability Association) MISRA C:2023 (2023), betaald £15.
- Barr Group: Embedded C Coding Standard (2018), gratis: **klik hier**!
- SEI (Software Engineering Institute) CERT (Computer Emergency Response Team) C Coding Standard (2016), gratis: **klik hier**!
- IPA (Information-technology Promotion Agency, Japan) Embedded System development Coding Reference guide [C Language Edition] (2018), gratis: **klik hier**!
- … vele anderen …

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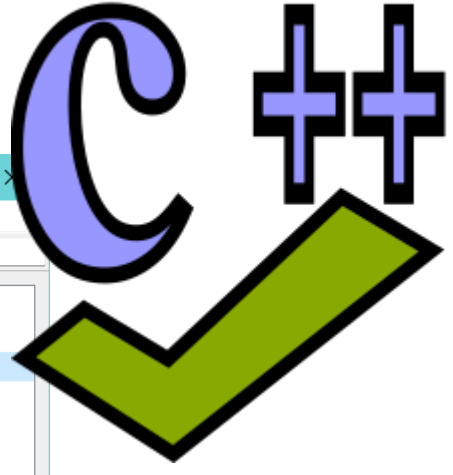
Static code analysis

- Wat is het?
- Welke gratis tools zijn beschikbaar voor C?
  - **Cppcheck**
  - Lint, Splint, Adlint, OCLint, PC-Lint, …
  - Clang –analyze
  - …
- Welke commerciële tools zijn er voor C?
  - Coverty
  - Klocwork
  - Parasoft
  - Helix QAC
  - …

https://en.wikipedia.org/wiki/List_of_tools_for_static_code_analysis#C,_C++

Cppcheck

http://cppcheck.sourceforge.net/



Cppcheck 2.7

Bestand Bewerken Weergave Analyze Help

Snel Filter:

Bestand	Ernst	Regel	Overzicht	Since date	Tag
foutje.c					
foutje.c	Waarschuwi...	10	Either the condition 'pi!=NULL' is redundant or there is possible null pointer dereference: pi.		
C:\BroJZ_g...	note	10	Assuming that condition 'pi!=NULL' is not redundant		
C:\BroJZ_g...	note	10	Null pointer dereference		

CWE: 476
Either the condition 'pi!=NULL' is redundant or there is possible null pointer dereference: pi.

```
1 #include <stdio.h>
2 #include <stdlib.h>
3 #include <stdbool.h>
4
5 // Dit programma bevat een subtiel foutje, dat door cppcheck wordt gevonden.
6 // Dit programma bevat ook een memory leak, maar dat wordt niet gemeld door cppcheck.
7
8 bool isPos(int *pi)
9 {
10     return *pi > 0 && pi != NULL;
11 }
12
```

Analysis Log | Warning Details | Functions | Variables

Voorbeeld foutje.c

https://bitbucket.org/HR_ELEKTRO/ems31/raw/master/Opdrachten/progs/cppcheck/foutje.c

```
// Bepaal of pointer pi naar een positief getal wijst
bool isPos(int *pi)
{
    return *pi > 0 && pi != NULL;
}

int main(void)
{
    int *p = malloc(sizeof(int));
    if (p != NULL)
        *p = 15;
    if (isPos(p))
        printf("*p is positief, zoals verwacht!\n");
```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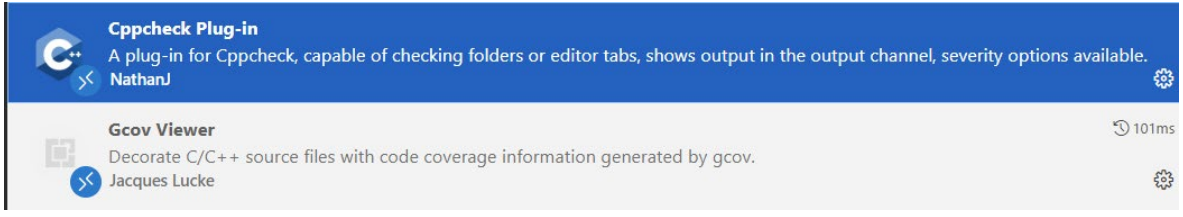
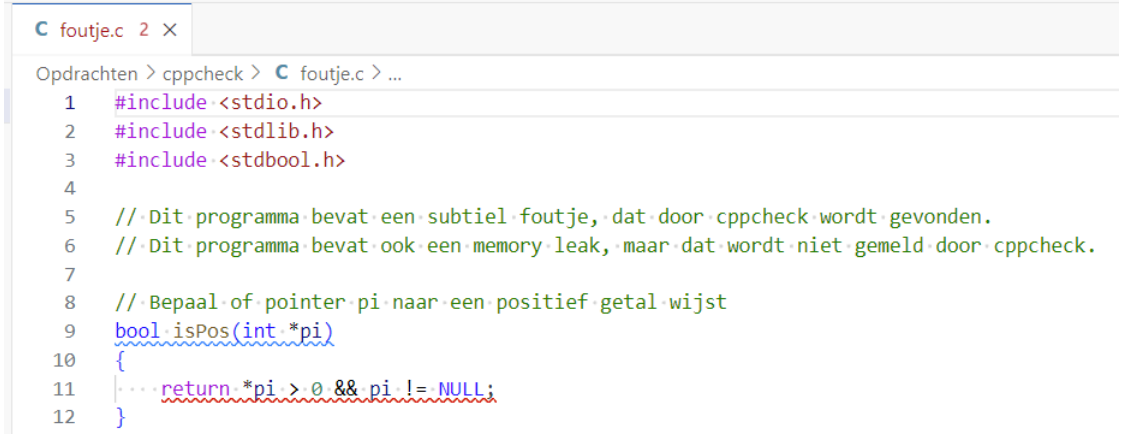
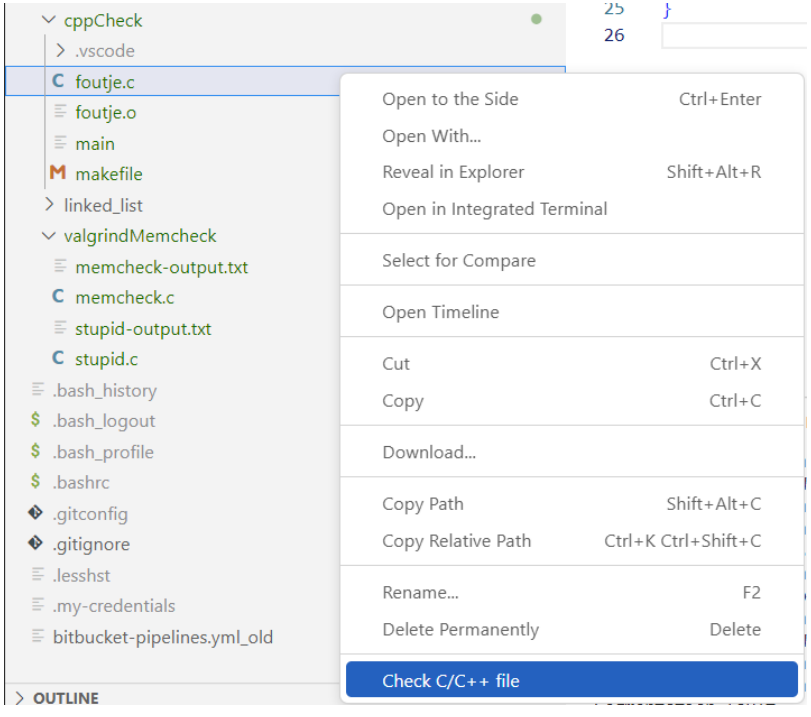
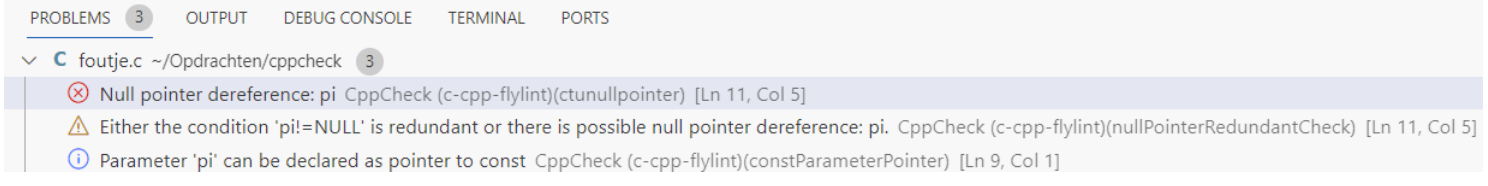
Cppcheck in VS Code

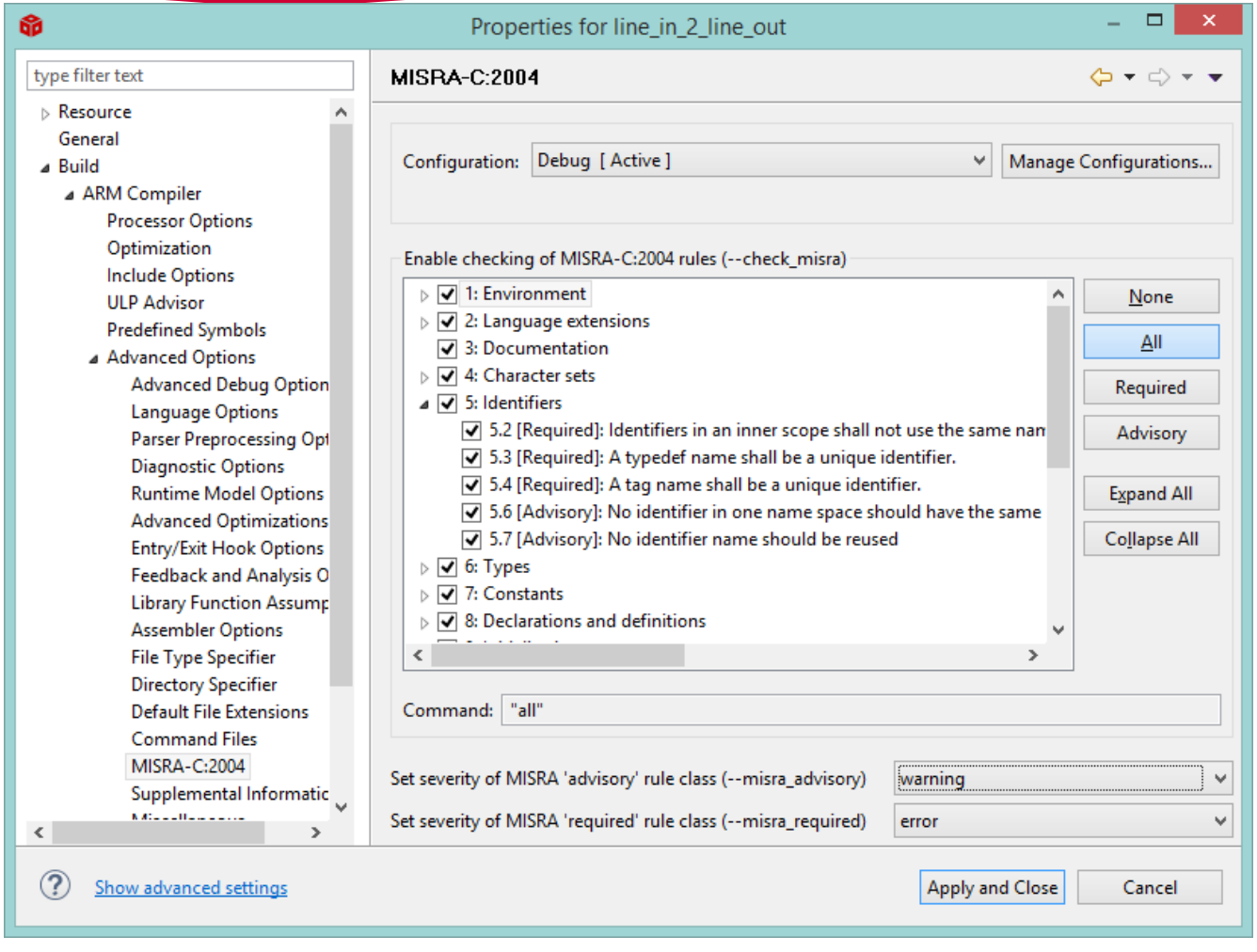








CCS kan MISRA-C 2004 checken



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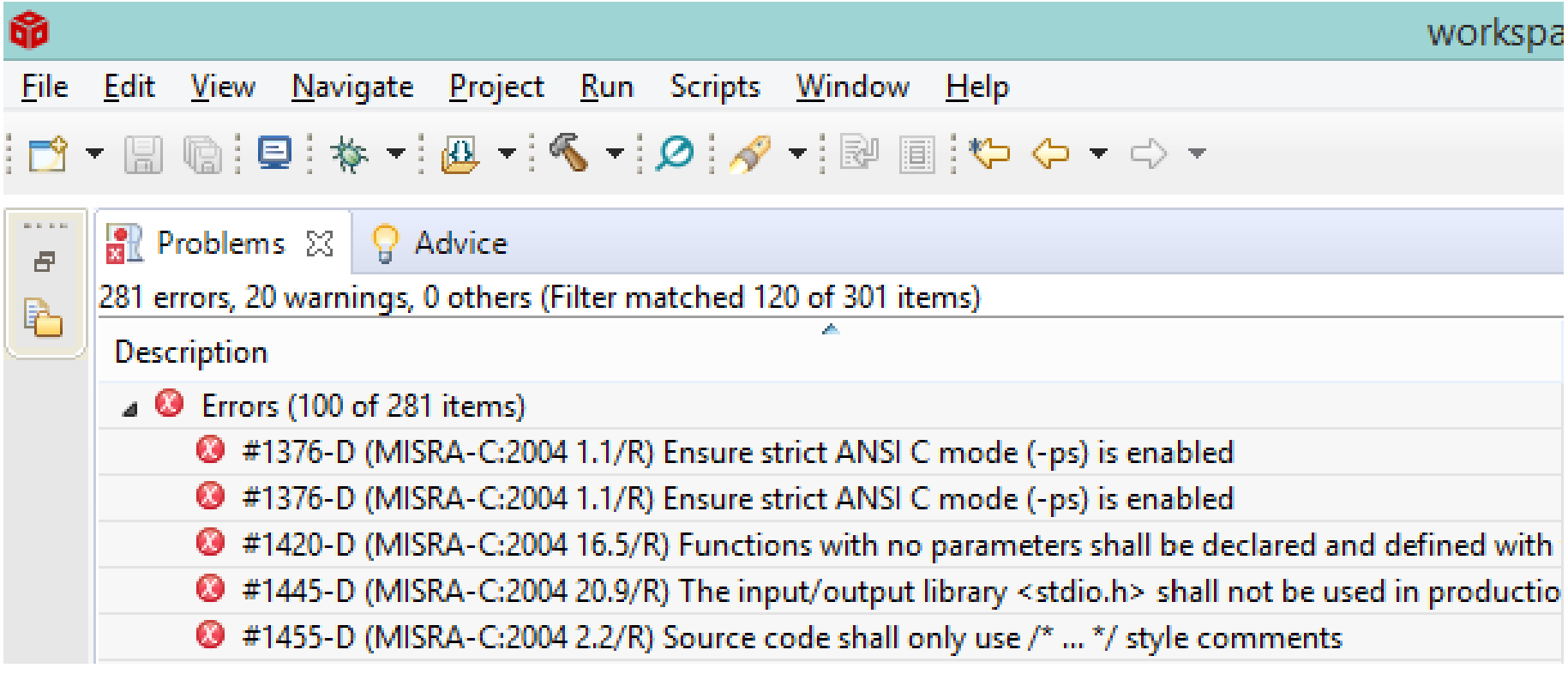
CCS MISRA-C 2004 code check



Volgende week…

Werken aan Eindopdracht 1

```
> hallo
Onbekend commando: "hallo"
> nul
leds: groen = 0, geel = 0, rood = 0
> zes
leds: groen = 1, geel = 1, rood = 0
> schakelroodaan
leds: groen = 1, geel = 1, rood = 1
> schakelgroenuit
leds: groen = 0, geel = 1, rood = 1
> schakelgeelom
leds: groen = 0, geel = 0, rood = 1
> schakelgeelom
leds: groen = 0, geel = 1, rood = 1
>
```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Aan de slag!

Aan de slag met [Opdrachten_Week_3.6.pdf]