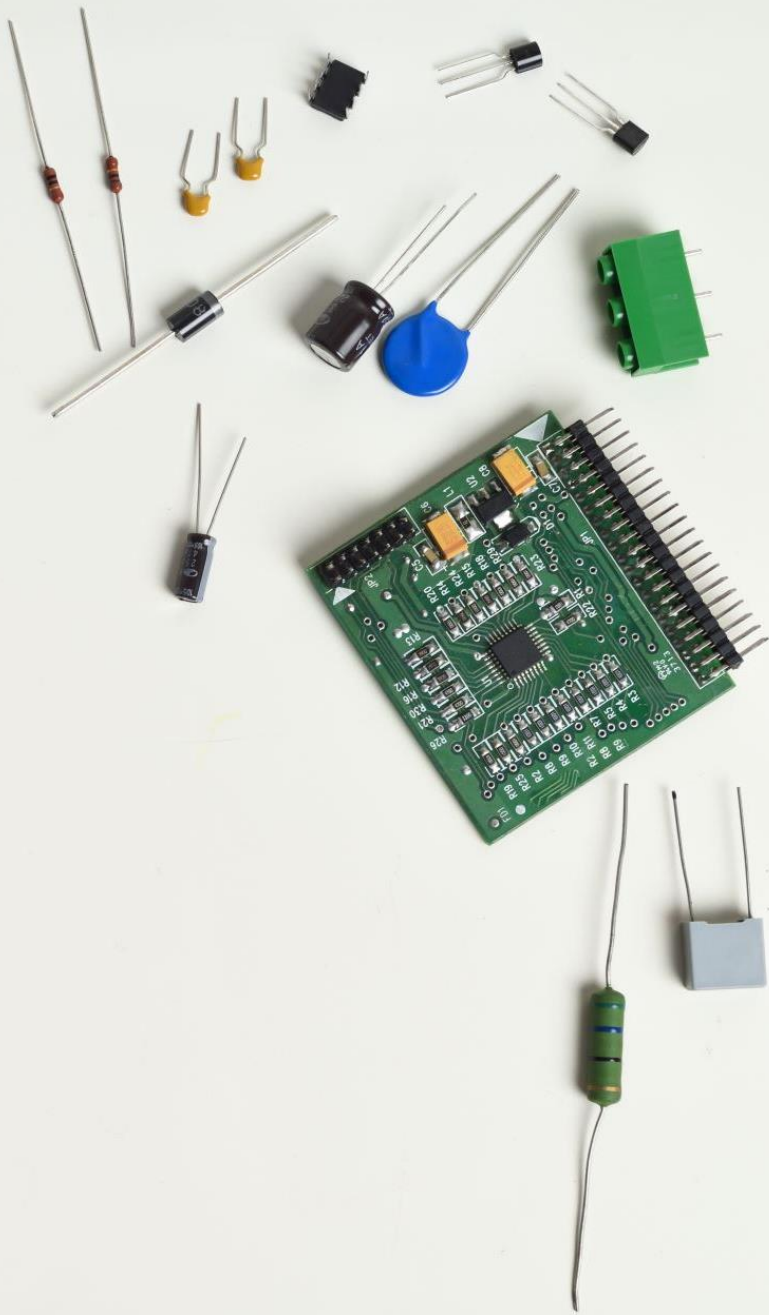


# C, C++ JA C# TURBEASPEKTID JA -VAHENDID

TOIVO PÄRNPUU



# C KEELED

- C, 1972, DENNIS RITCHIE
  - GITHUB: 53 271 PROJEKTI;
  - OP SÜSTEEMID, SÜSTEEMITARKVARA, RAKENDUSTARKVARA, IOT...
- C++, 1985, BJARNE STROUSTRUP
  - GITHUB: 56 857 PROJEKTI;
  - LEIDUB VÄGA PALJUDES SÜSTEEMIDES;
- C#, 2002, ANDERS HEJLSBERG
  - GITHUB: 56 446 PROJEKTI;
  - TÖÖLAUA-, VEEBIRAKENDUSED, MÄNGUD, IOT...
- JS 431 095 PROJEKTI GITHUB-IS

# STRING FORMAT

```
1  #include <stdio.h>
2
3  int main(int argc, char **argv) {
4      char *secret = "Suur saladus\n";
5      printf(argv[1]);
6      return 0;
7  }
8
```

```
1  #include <stdio.h>
2
3  int main(int argc, char **argv) {
4      char *secret = "Suur saladus\n";
5      printf("argument: %s", argv[1]);
6      return 0;
7  }
8
```

```
C:\Users\toivo\kood\cpp>02-stringformat.exe "Tere maailm"
```

```
Tere maailm
```

```
C:\Users\toivo\kood\cpp>02-stringformat.exe "Tere maailm %s %s %s %s ja parool: %s"
```

```
Tere maailm Ó!!ö  Dö  y!!ö ja parool: Suur saladus
```

```
C:\Users\toivo\kood\cpp>
```

```
C:\Users\toivo\kood\cpp>02-stringformat-fix.exe "Tere maailm"
```

```
argument: Tere maailm
```

```
C:\Users\toivo\kood\cpp>02-stringformat-fix.exe "Tere maailm %s %s %s %s ja parool: %s"
```

```
argument: Tere maailm %s %s %s %s ja parool: %s
```

```
C:\Users\toivo\kood\cpp>
```

# C JA C++ PUHVRI ÜLETÄITUMINE (BUFFER OVERFLOW)

```
1 int main()
2 {
3     char a[8] = "";
4     unsigned short b = 1979;
5     printf("muutuja a: %s \n muutuja b: %i \n\n", a, b);
6     strcpy(a, "excessive");
7     printf("peale strcpy funktsiooni: \n muutuja a: %s \n muutuja b: %i", a, b);
8 }
9
```

```
muutuja a:
muutuja b: 1979

peale strcpy funktsiooni:
muutuja a: excessive
muutuja b: 101
Process returned 0 (0x0)   execution time : 0.019 s
Press any key to continue.
```

variable name	A								B	
value	[null string]								1979	
hex value	00	00	00	00	00	00	00	00	07	BB

variable name	A								B	
value	'e'	'x'	'c'	'e'	's'	's'	'i'	'v'	25856	
hex	65	78	63	65	73	73	69	76	65	00

# KUIDAS SEDA ENNETADA?

- VALI TEINE PROGRAMMEERIMISKEEL (C, C++ OMAVAD MÄLULE OTSE LIGIPÄÄSU)
- KASUTA VASTAVAID TURVATEEKE (SECURE LIBRARIES)
- ENNE KUI ALUSTAD RAKENDUSE LOOMISEGA TUTVU TURVALISE PROGRAMMEERIMISE (SECURE CODING) PÕHIMÕTTEGA;
  - [C#](#)
  - [SEI CERT C CODING STANDARD](#)
  - [SEI CERT C++ CODING STANDARD](#)

- ALUSTUSEKS:

- [HTTPS://WWW.CPROGRAMMING.COM/TUTORIAL/SECURE.HTML](https://www.cprogramming.com/tutorial/secure.html)
- [HTTPS://WWW.PERFORCE.COM/BLOG/QAC/SECURE-CODING-STANDARDS](https://www.perforce.com/blog/qac/secure-coding-standards)
- [HTTPS://LEARN.MICROSOFT.COM/EN-US/CPP/C-RUNTIME-LIBRARY/SECURITY-ENHANCED-VERSIONS-OF-CRT-FUNCTIONS?VIEW=MSVC-170](https://learn.microsoft.com/en-us/cpp/c-runtime-library/security-enhanced-versions-of-crt-functions?view=msvc-170)
- [SEI CERT C CODING STANDARD: RULES FOR DEVELOPING SAFE, RELIABLE, AND SECURE SYSTEMS \(2016 EDITION\)](#)
- OWASP
- [ASVS](#)
- [HTTPS://RESOURCES.INFOSECINSTITUTE.COM/WP-CONTENT/UPLOADS/TOP-DOT-NET-SECURE-CODING.PDF](https://resources.infosecinstitute.com/wp-content/uploads/top-dot-net-secure-coding.pdf)

VEEL  
SOOVITUSI



A photograph of a kitchen sink area. The background is a white subway tile wall. The countertop is wooden and cluttered with various items: a black kettle, a glass jar, a yellow bowl, a blue bowl, a white mug, a dish rack with a yellow bowl, a white plate, a white bottle, a metal grater, a wooden cutting board, a knife block with several knives, a glass pitcher, and a tablet. The foreground shows dark grey kitchen cabinets with black handles. The word "TÄNAN" is written in white, bold, sans-serif capital letters across the center of the image. There are several translucent, glowing bubbles of different sizes overlaid on the image, primarily in the upper and lower right areas.

TÄNAN

# ALLIKAD

- [HTTPS://GITHUB.COM/TOPICS/C](https://github.com/topics/c)
- [HTTPS://GITHUB.COM/TOPICS/Cpp](https://github.com/topics/cpp)
- [HTTPS://GITHUB.COM/TOPICS/CSHARP](https://github.com/topics/csharp)
- [HTTPS://STACKOVERFLOW.COM/QUESTIONS/20839352/WHY-IS-C-USED-AS-THE-MAIN-PROGRAMMING-LANGUAGE-FOR-OPERATING-SYSTEMS](https://stackoverflow.com/questions/20839352/why-is-c-used-as-the-main-programming-language-for-operating-systems)
- [HTTPS://HACKERNOON.COM/WHY-AND-WHERE-SHOULD-YOU-STILL-USE-CC-LANGUAGES-6L1R838GH](https://hackernoon.com/why-and-where-should-you-still-use-cc-languages-6l1r838gh)
- [HTTPS://OWASP.ORG/WWW-COMMUNITY/VULNERABILITIES/BUFFER\\_OVERFLOW](https://owasp.org/www-community/vulnerabilities/buffer_overflow)
- [HTTPS://WWW.FORTINET.COM/RESOURCES/CYBERGLOSSARY/BUFFER-OVERFLOW](https://www.fortinet.com/resources/cyberglossary/buffer-overflow)
- [HTTPS://SECURITY.WEB.CERN.CH/RECOMMENDATIONS/EN/CODETOOLS/C.SHTML](https://security.web.cern.ch/recommendations/en/codetools/c.shtml)