История и особенности языка C и его экосистемы

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Содержание

Dennis Ritchie: The Development of the C Language

https://www.bell-labs.com/usr/dmr/www/chist.html

- Сеттинг
- Корни в других языках
- Использование сейчас

Мы периодически будем обращаться к этому тексту

Мотивация

Поколения ЭВМ

1. 1940е–1950е. Электромагнитные реле и радиолампы: 10^5 вт, большие машинные залы; доступны военным и работающим на них физикам
2. 1950е–1960е. Полупроводники (транзисторы, диоды): 10^4 вт, несколько стоек; доступны крупным учреждениям, банкам
3. 1960е–1970е. Интегральные схемы: $10^2 - 10^3$ вт, одна или несколько стоек; доступны небольшим учреждениям и лабораториям
4. 1970е–1980е–н.в. Микропроцессоры в одной интегральной схеме: $10 - 10^2$ вт, небольшой корпус, доступны мелким организациям, позже — физическим лицам

Setting

Common approach of 1960s

- Mainframes like IBM/360 or GE-645
- Programming languages like PL/I
- Operating systemc like OS/360 or Multics
- Batch control approach like JCL
- No powerful interactive shell

Everything is complicated and heavy-weight

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New approach of 1970s

- Simpler *and cheaper* mini-computers like DEC PDP-7
- More universal use of them
- Many computer families

Birth of Unix

Killer-features of Unix:

- Hierarchical file system with single tree of file names
- Agnostic approach to file data: before, data was usually stored in formatted files, which offered good throughput but were complicated for software developers
- Interactive powerful shell running in user space

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- And one more feature that we will describe later...

Before and After Unix

Note:

- Multics already offered many of above features, but still was too complicated; minimalist design was desired
- Above approaches were very good finding and they are still actual after 50 years: we see elements of such a design in such OSs as DOS and then Windows

See a pretty nice AT&T documentary on this:

- https://youtu.be/tc4ROCJYbm0

Early History

Popular languages of 1960s and before

- Fortran: one of the first, high-level, computational
- COBOL: business-oriented language
- PL/I: general purpose complicated language, suited better for systems programming than above two
- Assembly languages for many computer architectures, not portable

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- Assembly languages for many computer architectures, not portable
- *All above — not only assembly —* were not very portable
- They were not structural languages, which lead to poor quality code which was difficult to maintain due to spaghetti-code

Birth of C

- Compiled language
- Structural language
- Good for systems programming
- Simple enough and portable

What is structural programming?

Program consists of:

- Sequential blocks of operators
- Loops
- Branching (`if` — `else` — ...)
- All above can be used withing each other

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Additionally:

- `goto` is available but not welcome
- Procedures!
- Clean variable scopes (not as in Basic or Python!)

More links to look at

- Notes on Structured Programming. By Prof. Dr. Edsger W. Dijkstra — T. H. Report 70-WSK-03 Second Edition April 1970
- Dijkstra: EWD 215: A Case against the GO TO Statement (PDF).

C Predecessors

- 1960: Algol-60
- 1963: CPL
- 1967: BCPL
- 1969: B
- 1972: C

With Unix

C and Unix evolved together

- C was portable (not referring any particular architecture properties)
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In beginning of 1970s the majority of Unix code was re-implemented in C, which was one of the reasons of its popularity till now. Now we have it in servers, networking hardware, PCs, mobiles etc.

Recent History

1980s–1990s

- Cheap PCs
- Internet

1990s–2000s–now

- Many mobile and embedded architectures
- Parallel architectures

Вопросы

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