Embedded Systems Programming

POSIX standard

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POSIX – *ang. Portable Operating System Interface for Unix*

POSIX:

- an attempt to standardize the different distributions of the UNIX OS,
- Works start of 1985. Under the auspices of the IEEE. POSIX - IEEE 1003,
- Currently, The Open Group in cooperation with the IEEE and computer companies i.e. IBM, Sun Microsystems, HP, NEC Corp., ..., works on the development of the POSIX standard.
- Single UNIX Specification, Version x;
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- User interface – e.g. system commands
- API – programming interface
- Features of the system layer

POSIX standard
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- Systems compliant with POSIX: Mac OS X 10.5, QNX, BeOS, AtheOS / Syllable.
- Systems complying to a large degree with POSIX: GNU / Linux and FreeBSD.
- A certificate of compliance to POSIX obtained some Linux distributions: Linux-FT, Unifix Linux.
- Microsoft Windows – Cygwin and Interix environments allow the use of POSIX programming interface.
The set of POSIX standards:

- **P1003.1:**
  - Defines the application interface in that way, that it can be fully portable between different OS. This interface is based on UNIX models. It includes functions, that are often implemented as system calls.

- **P1003.1a:**
  - A set of various interpretations, clarifications and extensions (symbolic links).

- **P1003.1b:**
  - Extensions for real-time OS:
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- semaphores (binary);
- Memory locking process;
- memory-mapped files and shared memory;
- priority queuing;
- signals in real time;
- timers;
- IPC – inter-process communication;
- synchronous input / output operations (I/O);
- asynchronous input / output operations (I/O);

- P1003.1c:
  - Handling of the threads (lightweight processes);
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- P1003.1d:
  - Further functions supporting real-time systems;

- P1003.1e:
  - System security by security criteria the Department of Defense
    TCSEC - Trusted Computer System Evaluation Criteria;

- P1003.1f - h, P1003.2b – d, P1003.3, P1003.5, P1387, P1003.9, P1003.10, P1003.11, P1003.13, P1003.14, P1003.16, P1224.2
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- Costs:
  - IEEE – high level of the cost of POSIX documentation;
  - The alternative is the standard Single UNIX Specification - it is open, available free of charge and takes into account remark of everyone.
  - Standardization procedures including tests PCTS - POSIX Conformance Test Suite, are currently expensive;
  - Implementation, that the successfully pass the tests receive a certificate of compliance with the POSIX standard.