



PEARL (Process and Experiment Automation Realtime Language)

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Introduction

PEARL is the result of a standardization effort by the Deutsche Institut für Normung (DIN). The history of consecutive standardizations of different versions of the language is

- DIN 66253, Teil 1, Basic PEARL, 1981
- DIN 66253, Teil 2, Full PEARL, 1982
- DIN 66253, Teil 3, Mehrrechner PEARL, 1988
- DIN 66253, Teil 2, PEARL 90, 1998

Description

PEARL is an imperative language in the Algol tradition. It has block-structured scopes, functions and procedures, the usual data types including pointers. Particular emphasis is put on multi-tasking and the specification of real-time attributes of tasks.

Tasks can be activated in a time-triggered as well as an event-triggered way,

- with a given period (ALL 0.00005 SEC ACTIVATE controller),
- with reference to an absolute time (AT 12:00 ACTIVATE testalarm),
- at the occurrence of an event (WHEN sensorchange ACTIVATE actuator).

These attributes can be combined (AT 12:00 ALL 3 MIN UNTIL 13:00 ACTIVATE testalarm), (WHEN sensorchange AFTER 0.5 SEC ACTIVATE actuator).

Tasks can be synchronized on shared objects using semaphores and bolt variables.

- Semaphores can be counting with *request* and *release* operations. To avoid blocking on semaphores a *try* operation is available allowing testing the state of the semaphore.
- Bolt variables allow multiple reading accesses without a concurrent write access.
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PEARL has data types *clock* and *duration*. *Clock* allows dealing with time. 12:00 is a constant of the type *clock*. *Duration* allows dealing with durations. 0.00005 SEC is a constant of the type *duration*. Variables and values of these two types can be connected by arithmetic operations, e.g.

```
durationvar=clockvar-clockvar;  
clockvar=clockvar+durationvar;
```

PEARL supports the machine-independent formulation of programs by specifying in a SYSTEM section the I/O interfaces to the hardware and the sources of interrupts.

Conclusions and Future

The special interest group **Echtzeitsysteme und PEARL** of the Gesellschaft für Informatik is the forum of exchange for the PEARL community. They publish the PEARL News at <http://www.real-time.de/news/>

An introduction to the language is

Werum, W., Windauer, H.: Introduction to PEARL, Process and Experiment, Automation
Realtime Language. *Vieweg Verlag*, 1989 - ISBN 3-528-33590-4

The PEARL 90 report is available at <http://www.irt.uni-hannover.de/pub/pearl/report.pdf>