Summary of the course

- Advantages of the B Method:
  - supports the whole cycle of software development
    from an initial specification to code generation
  - supports data encapsulation and information hiding
  - based on familiar and well-understood mathematical
    foundations (set theory and predicate calculus)
  - supports automatic and interactive proof
  - animation gives immediate feedback on the correctness
    of an initial specification

Summary of the course

- The B Method and associated tool demonstrate
  a practical approach to the use of formal methods
  for software development.

- The use of formal methods in industry has been
  a slow and inconsistent process so far. The main
  reason − lack of industrial quality tools.

- The B Method proved its usefulness and strength
  by applications for development of large industrial
  systems.

Industrial Applications of the B Method

- METEOR – the automatic train operating system for the first driverless metro in the city of Paris (Matra Transport Intl., France)

- speed control system for the SNCF TGV (GEC Alsthom Transport, France)

- avionics system (GEC-Marconi Avionics, UK)

- smart card application (Gemplus, France)

Dependable systems

- Lately the B Method is often applied for development of (so called) *dependable systems*.

- Dependable systems are software systems that must satisfy additional requirements or characteristics expressing how trustworthy the system is.

- The characteristics of dependability are safety, reliability, performance, confidentiality etc.

Dependable systems (cont.)

- The B method is used to evaluate and verify the following dependability attributes:

  – <u>functionality</u> (whether the system provides the services required by the user)

  – <u>performance</u> (the speed and capacity of the software)

  – <u>safety</u> (whether the specified system can lead to hazardous situation or accident)

  – <u>reliability</u> (the probability that the software will execute without failure for a given period of time)