

# Lecture 05

## Language Evaluation Criterion

**Mr. Mubashir Ali**

**Lecturer (Dept. of Computer Science)**

[dr.mubashirali1@gmail.com](mailto:dr.mubashirali1@gmail.com)

# Summary of Previous Lecture

- 1. Language Evaluation Criterion Continued**
- 2. Readability**
- 3. Writability**
- 4. Orthogonality**
- 5. Reliability**

# Outline

- 1. Reliability**
- 2. Cost**
- 3. Portability**
- 4. Generality**
- 5. Implementation methods**
- 6. Babbage Analytical Engine**
- 7. ENIAC**

# Reliability

- Aliasing
- Writability

# Cost

- Training
- Cost of writing programs in the language – productivity
- Programming environment
- Compiling
- Execution
- optimization versus compilation speed
- Cost of language implementation
- Cost of poor reliability
- Maintenance – a function of readability

# Other Criterion

- Portability
  - Standardization
- Generality
  - Applicability to a range of domains

# Implementation Methods

- Compilation
- Pure interpretation
- Hybrid implementation systems

# Issues and trade-offs

- Competing criterion
  - execution versus safety
  - readability versus writability
    - `a += b;`
    - `a = a + b;`
    - `( a > b ) ? a = c : a = d ;`
    - `if ( a > b )`
      - `a = c;`
      - `else`
        - `a = d;`
  - execution versus compilation
- How to assign weights to different criterion?



# Babbage's Analytical Engine

- 1820's - could only be made to execute tasks by changing the gears which executed the calculations.
- Thus, the earliest form of a computer language was physical motion.

# ENIAC

## (Electronic Numerical Integrator and Calculator)

- Eventually, physical motion was replaced by electrical signals when the US Government built the ENIAC in 1942.
- It followed many of the same principles of Babbage's engine and hence, could only be "programmed" by presetting switches and rewiring the entire system for each new "program" or calculation.
- This process proved to be very tedious.

# Summary

- ✓ **Reliability**
- ✓ **Cost**
- ✓ **Portability**
- ✓ **Generality**
- ✓ **Implementation methods**
- ✓ **Babbage Analytical Engine**
- ✓ **ENIAC**