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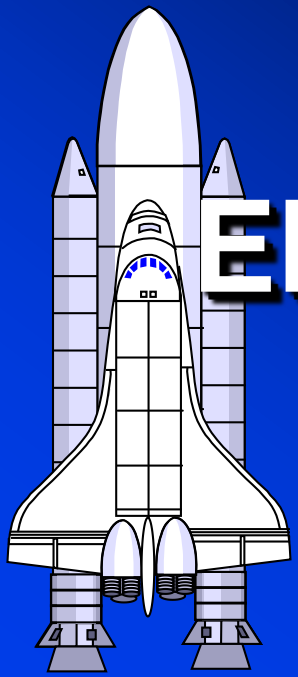
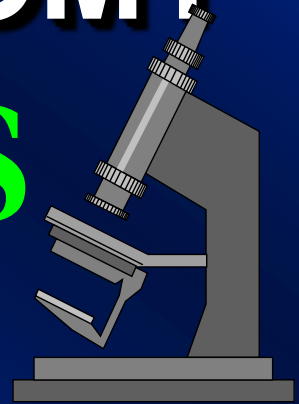
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# INTRODUCTION TO ENGINEERING ECONOMY

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# **WHAT IS ECONOMICS ?**

**The study of how limited resources is used to satisfy unlimited human wants**

# WHAT IS ECONOMICS ?

The study of how individuals and societies choose to use scarce resources that nature and previous generations have provided.

# Resources

# Resources

- Land
- Labor
- Capital

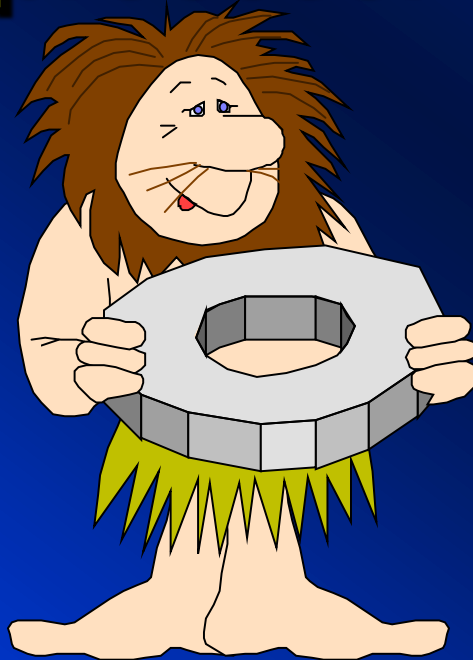
# LAND

**All gifts of nature, such as: water, air, minerals, sunshine, plant and tree growth, as well as the land itself which is applied to the production process.**



# LABOR

The efforts, skills, and knowledge of people which are applied to the production process.



# CAPITAL



- **Real Capital (Physical Capital)**
  - Tools, buildings, machinery → things which have been produced which are used in further production



- **Financial Capital**
  - Assets and money which are used in the production process

- **Human Capital**
  - Education and training applied to labor in the production process





# **Origins of Engineering Economy**

**The perspective that ultimate economy is a concern to the engineer and the availability of sound techniques to address this concern differentiate this aspect of modern engineering practice from that of the past.**

# Origins of Engineering Economy

- Pioneer: Arthur M. Wellington, civil engineer  
latter part of nineteenth century;  
addressed role of economic analysis in  
engineering projects;  
area of interest: railroad building
- Followed by other contributions which  
emphasized techniques depending on  
financial and actuarial mathematics.

# **PRINCIPLES OF ENGINEERING ECONOMY**

- 1. Develop the Alternatives;**
- 2. Focus on the Differences;**
- 3. Use a Consistent Viewpoint;**
- 4. Use a Common Unit of Measure;**
- 5. Consider All Relevant Criteria;**
- 6. Make Uncertainty Explicit;**
- 7. Revisit Your Decisions**

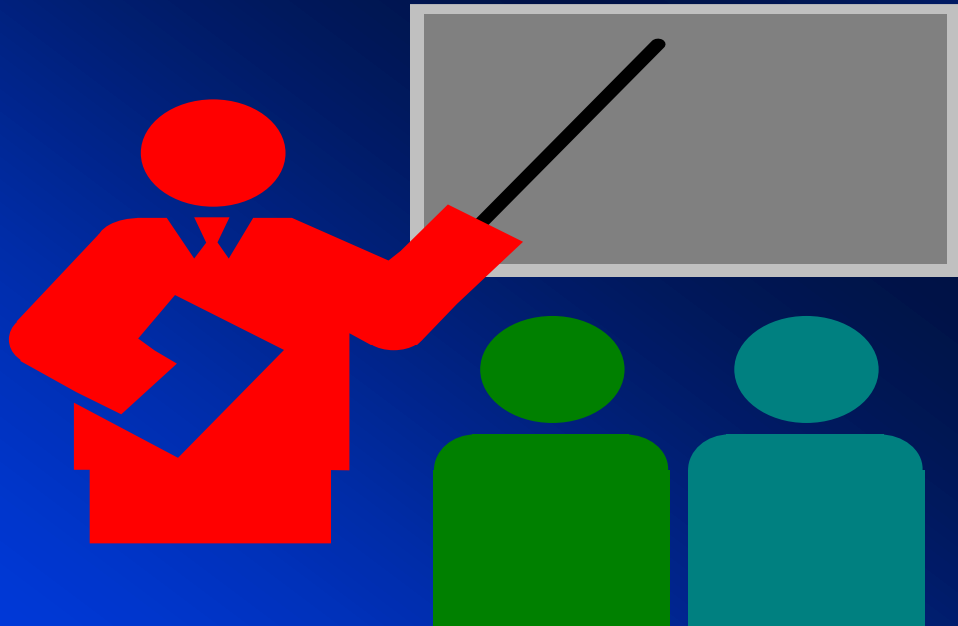
# DEVELOP THE ALTERNATIVES

The final choice (decision) is among alternatives. The alternatives need to be identified and then defined for subsequent analysis.



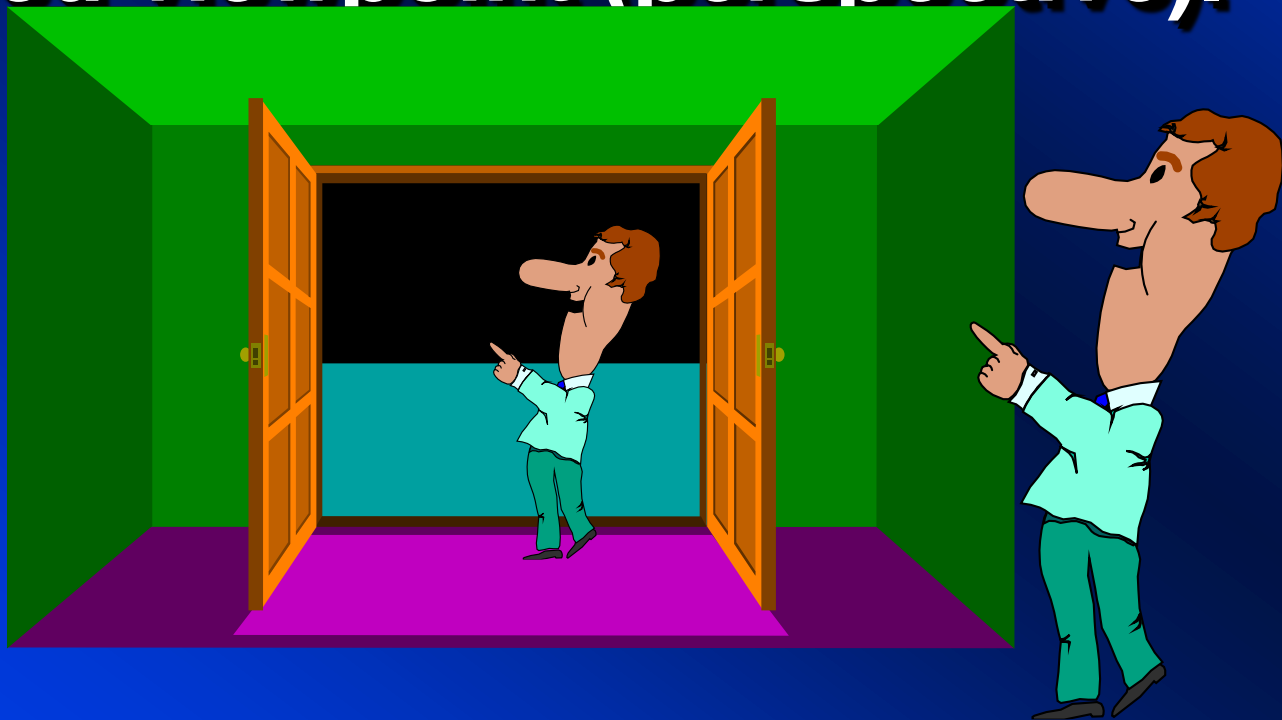
# FOCUS ON THE DIFFERENCES

Only the differences in expected future outcomes among the alternatives are relevant to their comparison and should be considered in the decision.



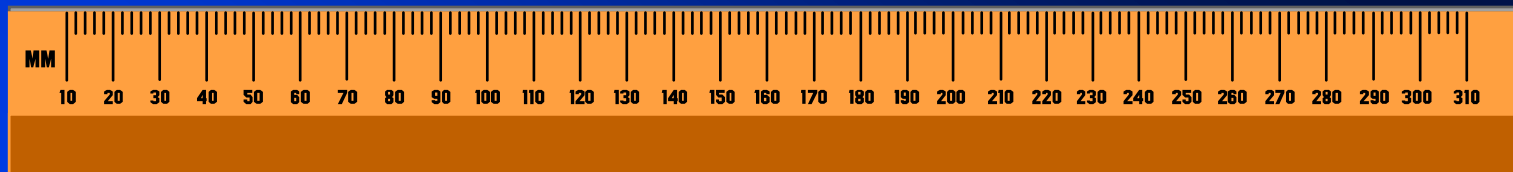
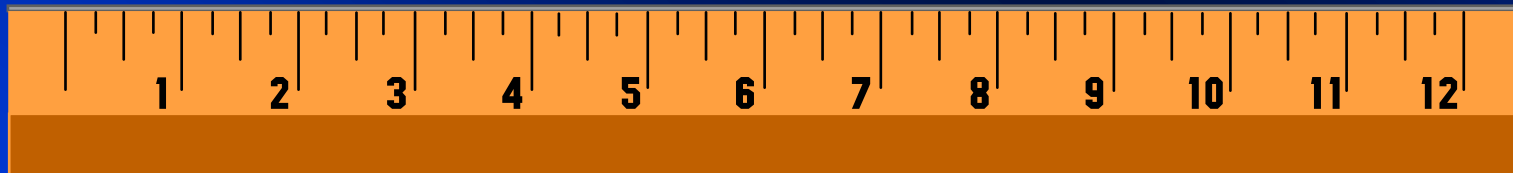
# USE A CONSISTENT VIEWPOINT

The prospective outcomes of the alternatives, economic and other, should be consistently developed from a defined viewpoint (perspective).



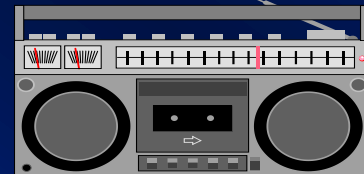
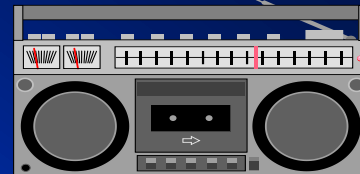
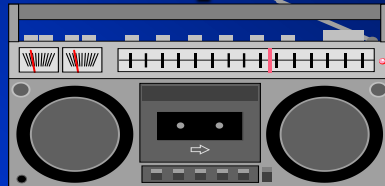
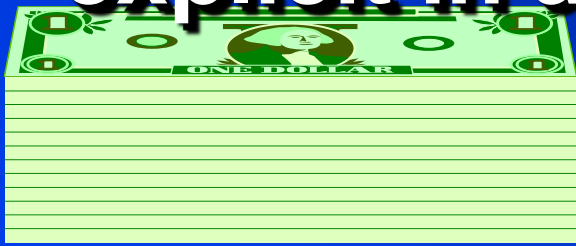
# USE A COMMON UNIT OF MEASURE

Using a common unit of measurement to enumerate as many of the prospective outcomes as possible will make easier the analysis and comparison of alternatives.



# CONSIDER ALL RELEVANT CRITERIA

Selection of a preferred alternative (decision making) requires the use of a criterion (or several criteria). The decision process should consider the outcomes enumerated in the monetary unit and those expressed in some other unit of measurement or made explicit in a descriptive manner.





# MAKE UNCERTAINTY EXPLICIT

Uncertainty is inherent in projecting (or estimating) the future outcomes of the alternatives and should be recognized in their analysis and comparison.



# REVISIT YOUR DECISIONS

Improved decision making results from an adaptive process; to the extent practicable, the initial projected outcomes of the selected alternative should be subsequently compared with actual results achieved.



# **ENGINEERING ECONOMY AND THE DESIGN PROCESS**

**An engineering economy study is accomplished using a structured procedure and mathematical modeling techniques. The economic results are then used in a decision situation that involves two or more alternatives and normally includes other engineering knowledge and input.**

# **ENGINEERING ECONOMIC ANALYSIS PROCEDURE**

- 1. Problem recognition, formulation, and evaluation.**
- 2. Development of the feasible alternatives.**
- 3. Development of the cash flows for each alternative.**
- 4. Selection of a criterion ( or criteria).**
- 5. Analysis and comparison of the alternatives.**
- 6. Selection of the preferred alternative.**
- 7. Performance monitoring and post-evaluation results.**

# **ACCOUNTING AND ENGINEERING ECONOMY STUDIES**

**Modern cost accounting may satisfy any or all of the following objectives:**

- 1. To determine the cost of products or services**
- 2. To provide a rational basis for pricing goods or services**
- 3. To provide a means for controlling expenditures**
- 4. To provide information on which operating decisions may be based and the results evaluated**