From Applying Software Engineering Principles, David Marca
Time Spent in Software Development Activities

- Analysis – 30%
- Design – 30%
- Implementation 20%
- Installation – 20%
Maintenance Costs of Software Systems Are Large

Development – 33%

Maintenance – 67%
Principles:

• Change, even to well built software systems is inevitable.
  – Some changes occur because the system still has some errors

• Late Software may not be useable.
Principles:

• Controlled Change
  – Modifiability means controlled change

• Planning
  – Any plan is better than no plan
Principle:

• Verification is NOT Validating
  – Verifying a program correct means that the program will generate correct outputs for all inputs.
    • the process of evaluating a system or component to determine whether the products of a given development phase satisfy the conditions imposed at the start of that phase
  – Validating is checking to see if the program answers questions about its subject correctly.
    • the process of evaluating a system or component during or at the end of the development process to determine whether it satisfies specified requirements
Principle:

Build Software in Stages (that can be tested)
Impact of Errors made during Software Development

When an error was made:

Cost to Fix After Installation

Analysis | Design | Implementation | Installation

When an Error was Made
Errors in a Stable Software System

Number of Errors

Time
Errors in an Unstable Software System

Number of Errors

Time
Programming Personalities

Awareness of Real World Factors

Established Purpose

Undirected Programmer

Software Engineer

Compulsive Programmer

Serious Programmer