

ABSTRACT

A Software Planning and Development Methodology with
Resource Allocation Capability. (December 1986)

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The purposes of this research are to examine the planning and development of large, generic based software development projects and to propose a structured methodology for software planning and development (SPD). The SPD methodology presented parallels the classic software life cycle protocol and can be used in conjunction with this life cycle model to structure decision making and resource planning in a variety of environments. The concepts of kernel construct and "templates" are developed in conjunction with a resource planning and allocation procedure. Three distinct elements are integrated throughout the proposed methodology: Technical, Managerial, and Resource Use determination. Manpower loading relationships are developed to devise an allocation scheme for different personnel resources required within the software development effort.

The generic kernel and associated templates are shown to apply to virtually any type of software development environment. A major software development project is comprised of many different generic kernels, each one representing a different function or routine within the software design. Various templates are used to tailor the kernels to a specific application environment. This tailoring facilitates graphical depiction of the necessary interconnections, databases, and protocols to be identified.

Cost estimation based on resource use is determined for in-house personnel development and external contract vendor development. A building block approach to cost estimation is presented. Each block represents a specific development step of the SPD methodology for software design and development. A personnel resource allocation matrix (PRAM) is designed, which shows the relationships between the personnel resource types, the personnel types available in-house for each step, and the requirements for external contract support. The total personnel cost of the project can be estimated from the various entries of the PRAM, broken down by quantity of in-house and contract support. The fiscal and equipment resources are discussed in the SPD methodology and the cost estimation for personnel is modeled.

All examples presented are based upon a manufacturing scenario; however, the methodology is applicable to any type of software development activity.