

THE DESIGN AND
IMPLEMENTATION OF
QNEMU: AN INTERACTIVE QUEUEING
NETWORK ANALYSIS PACKAGE

b y

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ABSTRACT

In this thesis a number of design objectives are discussed for the generation of interactive packages. Two of the most important are considered to be portability and user friendliness. Unfortunately these can at times produce conflicting design aims.

The objectives identified are incorporated into the design and implementation of a menu driven package that analyses networks of queues.

A brief description of the way the package was implemented is included, as is a discussion on the validation of the package so far carried out.

The primary use of the package is seen to be in the performance evaluation of computer systems, but it need not be restricted to this class of application.

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0 INTRODUCTION

The widespread development of interactive systems has brought with it a requirement for much improved interfaces which are not based on the concept of the card based interfaces of the earlier systems. The most widespread form that this improved interface takes currently is the menu. However menu driven interfaces have problems in satisfying users with varying ranges of skill and experience. In addition many menu driven systems contain a complex tree of menus which can cause the user to become disorientated.

Users without a knowledge of interactive computer systems can be easily put off using a system if it is difficult to understand and use. Our main interest lies within the area of statistics (analytic modelling in particular), where many of the packages, such as Minitab and SPSS, are little more than interactive batch entry, punched card image systems. What is needed, is software which provides users with an interface to translate their requirements into a simple set of commands that produce clear results.

We begin in Chapter One with a general discussion of desirable design goals for interactive packages, with particular reference to those packages that require complicated input and output.

Following on from this discussion, a description is given in Chapters Two and Three of an analytic queueing network modelling package (QNEMU) that was designed using the design goals of Chapter One.

An important aspect of any modelling package is its validation, and so Chapter Four describes the validation exercises so far carried out on the QNEMU package.

Chapter Five gives some indication of further areas of research related to the QNEMU package.

The body of this thesis that relates specifically to the QNEMU package subsumes a knowledge of modelling, and performance modelling in particular using analytic queueing theory techniques. Those readers who require a "refresher" of performance evaluation techniques should read Appendix H; of particular relevance are sections H.7 and H.8.