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Simulation of Queueing Systems

Using Pascal Language

A Research Submitted for Partial Fulfillment for The Degree of M.Sc in Statistics.

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DEDICATION

To my parents.

To my brothers and sisters.

To my grand mother.

To my friends.

To all whom I love...

ACKNOWLEDGEMENT

First of all I would like to thanks Allah for providing me the strength and ambition to fulfill this study .thanks also are direct to my supervisor **Dr. Hamed Humida Ahmed** for his valuable advice and advice and assistance throughout the hole time spent in writing this research .Really his assistance has loaded me with courage to exert more efforts in my study.

Iam grateful to all those who stood beside me and gave me support to bring this work.

ABSTRACT

The aim of this study is to formulate models that can be used to simulate the behavior of queueing systems in order to know the range of the efficiency of service centers to offer service in short time with least cost .To achieve this aim the researcher has designed to programs using Pascal Program Language .These programs make use of the previous data taken from the system (inter arrival times and service time of units and it's probabilities or it's probability distribution) .Then the user must enter the number of customer s whom the user want to simulate .here this programs calculate the cumulative probabilities of these times, after that the programs generate the random numbers which imitate these times .Then it is possible to know the time of arrival for each units ,service time ,time service begin ,time service end ,time spent by units in the queue ,also these models calculate the average of waiting time.

The advantages of these programs can be summarized as following:

-To facilitate the system study behaviour in the long run in short time.

-Minimizing effort and cost .

-Calculating the measurements special for queueing system .

-Establishing a basement for decision makers to depend on concerning the system.

الخلاصة

الهدف الاساسي لهذه الدراسة هو توفير نماذج يمكن من خلالها محاكاة سلوك صفوف الانتظار للتعرف على مـدى كفـاءة أو فعاليـة مركـز أو مراكـز تقـديم الخدمـة فـي اقصـر وقـت بأقـل تكلفة.ولتحقيق هذا الهدف قام الباحث بتصميم برنامجين باستخدام لغة الباسكال .تقوم هذه البرامج بالاستفادة مـن البيانـات السـابقة للنظام (الأزمان بين الوصول والوصـول السـابق لـه و زمـن تقـديم الخدمة لكل وحدة مـع احتمالاتهـا أو تـوزيعه الاحتمـالي).بعـد ذلـك يجب على المستخدم إدخال عدد الوحدات التي يريد محاكاة سلوك النظـام عنـدها ،عنـدها تقـوم هـذه البرامـج بحسـاب الاحتمـالات التجميعية المناظرة لهذه ألازمان ثم توليد الأرقام العشـوائية الـتي تقوم بمحاكاة هذه الأزمان .بعد ذلك يمكن معرفـة أزمـان الوصـول لكل وحدة وزمن بداية الخدمة وزمن الخدمـة وزمـن نهايـة الخدمـة والزمن الذي تقضيه الوحدة في صف الانتظار ومن ثم تتمكن هـذه النماذج من حساب متوسط زمن الانتظار .

ويمكن تلخيص ميزة هذه البرامج في الاتى:

-تتيح دراسة سلوك النظام على المدى الطويل في وقت قصير.

-اختصار الجهد والتكلفة.

-حساب المقاييس الخاصة بصفوف الانتظار.

-تـوفير قاعـدة لمتخـذي القـرار يتـم الاعتمـاد عليهـا فيمـا يختـص بالنظام.

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