Lozovska L.I.
Candidate of Physico-Mathematical Sciences,
Senior Lecturer at Department of Economic Informatics,
National Metallurgical Academy of Ukraine
Bandorina L.M.
Candidate of Economic Sciences,
Senior Lecturer at Department of Economic Informatics,
National Metallurgical Academy of Ukraine
Lozovskyi O.S.
Postgraduate Student at Department of Economic Informatics
National Metallurgical Academy of Ukraine

APPLICATION OF SIMULATION MODELLING FOR WORK SCHEDULING IN CASH REGISTER AREA

The process of serving customers at shop's cash registers is affected by many various factors. Scheduling this process is not an easy task as it is desired to avoid queues and downtimes. Simulation modelling allows quick and efficient construction of models, which then can be analysed from different viewpoints without spending extra time and effort. Automated work scheduling system for cash register area should automate personnel jobs, reduce delays between the actual sale, acquisition of the primary information, its processing, and producing the reports, which, in its turn, enables active management of the sale process. Our main goal was to reduce the downtime of equipment and economic losses resulting from inefficient work scheduling. We research methodical aspects of work scheduling, substantiate the need for the simulation model, construct a model of cash register area using Arena software, determine an optimal count of cash registers, study the constructed model dynamics. Future goals include the development of a standalone software system for work scheduling in cash register area.

In pursuit of our goal, we solved the several problems. We have applied queuing theory for the formalization of simulation models, developed steps for work scheduling in cash register area, implemented simulation models according to these steps, conducted a series of simulation experiments with varying control parameters, processed and analysed the results, and finally constructed a software system implementing work scheduling in cash register area.

The methodical approach of using a two-step model for work scheduling in cash register area is the novel part of our work. The first step is to use an existing simulation software (Arena) for development and analysis of the simulation model, by using model experiments to determine the optimal count of active cash registers at each point of time. The second step is to determine the optimal work schedule; it requires the development of a new software product.

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