Systematic Pedagogy to Queuing Theory with Excel

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Abstract: Over the past ten years, simple and inexpensive operations research software that is user friendly to the engineer, mentor, and instructor has become difficult to obtain. STORM 4.0 for Windows (Emmons, 2001), which was one of the primary student learning tools, is a 16-bit program and will no longer perform on 32 or 64-bit systems. Thus, it is no longer available. After a diligent search, it appears that there is no adequate, inexpensive, alternative software. SAS-Operations Research (OR) which provides algorithms for queuing theory is costly and is not included in the general licensing agreement. This paper presents pedagogy from a systems approach using Microsoft Excel. A spreadsheet file was created that successfully applies queuing theory to waiting lines, or queues. Data were collected from a Western North Carolina local bakery and food service industry. The arrival times were Poisson distributed and the service times were normally distributed. From this analysis a spreadsheet model was constructed. Several different problems were analyzed. These calculations showed that the spreadsheet model was accurate at describing queuing theory dynamics. The major advantage to the practitioner, engineer, instructor and student is that Excel is readily available on all personal computers (both nationally and internationally), easily understood, and is very practical. Also students with very little exposure to queuing theory were able to master the method within the first hour of exposure.

Keywords: Waiting Lines, Queuing Theory, Pedagogy, Excel