Student Name: Sara Azarnoush
Student ID: 98170668

Computer Simulation

Tasks

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1. CHAPTER 1

   Emulator VS Simulator

   A simulator is intended to produce an environment with all of the software configurations and variables that will be present in the actual production environment for an app. An emulator, on the other hand, makes an effort to replicate all of the hardware and software characteristics of a production system. You normally need to create an emulator in assembly code to accomplish this. Simulators do not, however, make an effort to mimic the hardware that will really run the application while it is in use.

   Simulators can be developed using high-level programming languages because they merely construct software environments.

   Therefore, one may consider emulators as existing somewhere in the center of simulators and actual hardware. Emulators imitate both hardware and software features, in contrast to simulators, which solely imitate environment features that may be adjusted or created using software.

2. CHAPTER 2

   (a) Multi-channel/Single-phase system
   There are numerous servers and a one-step service method in a multi-channel, single-phase business. A ticket desk for an airline could have distinct lines for passengers traveling in business and economy classes.

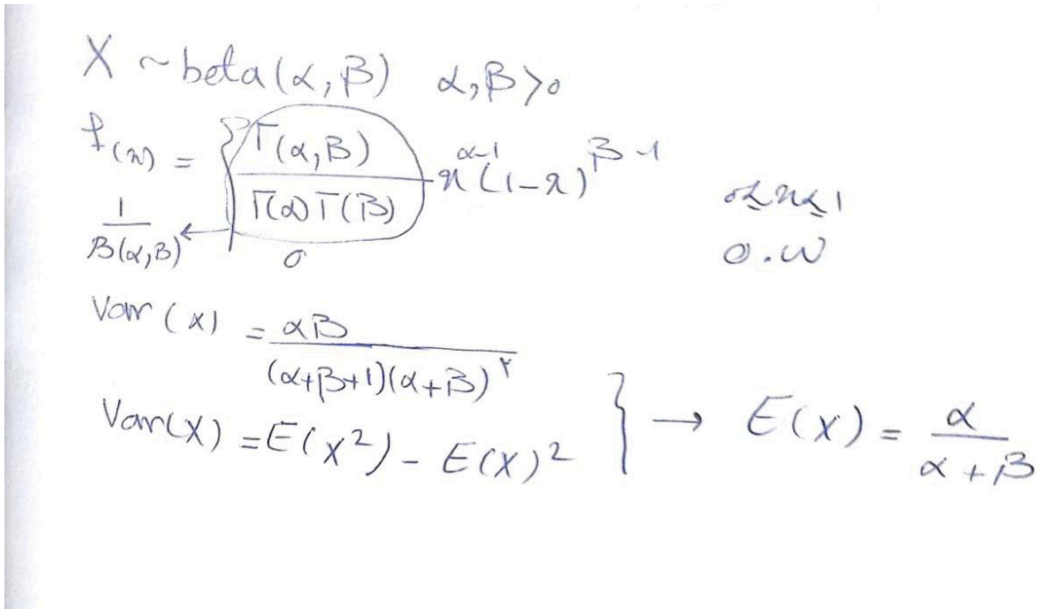
   (b) Multi-channel/Multi-phase system
   Multiple servers and a multi-step service procedure are features of a multi-channel, multi-phase business. A laundry facility with numerous washers and dryers is an example.

   (c) Single-channel/Single-phase system
   There is only one server in a single-channel, single-phase enterprise. The customer is given complete service as soon as they are attended to. An automated car wash is an example.

   (d) Single-channel/Multi-phase system
   One server and a multi-step service process are features of a single-channel, multi-phase enterprise. Taking retail banking as an example, there are many counters for withdrawals, deposits, opening new accounts, etc.

3. CHAPTER 3

   Image



4. CHAPTER 4

   Jupyter file in zip

5. CHAPTER 5

   Excel file in zip

6. CHAPTER 7

   Image

PDF

$$f(x) = \begin{cases} 0 & x < a \\ \frac{2(x-a)}{(b-a)(c-a)} & a \le x < c \\ x = c \\ \frac{2(b-x)}{(b-a)(b-c)} & c \le x \le b \\ 0 & x > b \end{cases}$$

CDF

$$D(x) = \begin{cases} \frac{(x-a)^2}{(b-a)(c-a)} & a \le x < c \\ 1 - \frac{(b-x)^2}{(b-a)(b-c)} & c \le x \le b \end{cases}$$

$$\text{Mean} = \frac{a+b+c}{3}$$

$$\text{mode} = c$$

$$\text{Var} = \frac{a^2+b^2+c^2-ab-ac-bc}{18}$$

inverse CDF

$$D^{-1}(u) = \begin{cases} a + \sqrt{(b-a)(c-a)u} & 0 < u < \frac{c-a}{b-a} \\ b - \sqrt{(b-a)(b-c)(1-u)} & \frac{c-a}{b-a} \le u < 1 \end{cases}$$

$U \sim U(0;1)$

if $\rightarrow U < (c-a)/(b-a) \iff X \leftarrow a + \sqrt{(b-a)(c-a)U}$

else $X \leftarrow b - \sqrt{(b-a)(b-c)(1-U)}$