

## Course Review: Introductory Part.

- Introduction to Services and Queues (Service Nets = Queueing Nets)

Our Service Economy.

Tele-Services (Telephone, Internet, email, Fax, Chat).

Queues in service systems are here to stay (at least for a while).

Operational Queues: Perpetual, Predictable, Stochastic.

- Measurements: The First Prerequisite

Transaction-based (time-based) measurements.

Face-to-Face, Telephone, Transportation, Internet, Administrative Services.

Scenario Analysis (vs. Simulation or Analytical Models): very typical or rare event.

- Models: The Second Prerequisite

Empirical Models: data-based; simple yet possibly far-reaching.

The Skeptic (Flanders).

vs. The Believer/Practitioner (Larson, our class).

- The Fluid View; A Deterministic Service-Station

Averaging over many (similar enough) scenarios.

Capacity/Bottleneck analysis (via spreadsheet,LP).

Utilization Profiles for resources.

Inventory Buildup Diagrams (via “National Cranberry” HBS case).

- The Processing Network Paradigm

TQM (80's), continued by BPR (90') = Business Process ReEngineering.

Dynamic Stochastic Project/Processing Networks (DSP-nets = DS-PERTs).

Applications: Arrest-to-Arraignment, Israeli Electric Company, Multi-Project Management;

Y Operational Q's: scarce resources; synchronization/coordination gaps, design constraints.

Q1: Can we do it? via Bottleneck Analysis  $\leftrightarrow$  the fluid view.

Q2: How long will it take? typically via stochastic networks.

Q3: Can we do better? via parametric/sensitivity/what-if analysis.

Q4: How much better? via optimality/approximation analysis.

- Towards modelling a Stochastic Service Station: the main building blocks

Arrivals' epochs: Poisson = *the* model for completely random arrivals.

Service durations: within the Phase-type framework.

Customers' patience