Gaining Competitive Advantage
From Operations
Using the HOM Software System

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Outline

- History
- Software details
Brief History

■ STORM in 1993
■ 1994 January First Project
■ Fall 1994: QuattroPro add ins
■ Spring 1995: Upgrade, Excel macros
■ Fall 1995 through Spring 1996: HOM 2.1
■ Spring 1997: Started Windows version
■ March 1998: HOM 3.0 (Preview Edition)
■ November 1998: HOM 3.0 (Release Version)
Philosophy

- Operations Key to Gaining and Maintaining Competitive Advantage for Most Firms

- Key Facilitators
  - Process
  - Supply Chain
  - Capacity
  - Responsiveness
  - Quality
Contents

- Software - HOM
- Cases
- Solutions
Capabilities - Software - HOM

- Windows 3.1/95/98/NT Compatible
- Single Window Problem Formulation
- Optimum Seeking Where Appropriate
- Simulation Modeling
- Spreadsheet/Managerial Orientation
- How to Solve - Help
- Simple Import/Export of Data and Results
Capabilities ...

- Networkable
- Available for downloading off the internet
Capabilities - Cases

- Tutorial Case -- Master Craftsmen of Newport
  - A case covering every HOM application with discussion of problem formulation, data files, screen shots of Input and Output windows, and interpretation of results.

- Two Integrative Proprietary Cases that Cover Every Operations Issue
  - Ice Queen Snow Blowers (Manufacturing)
  - United Branch Bank Consolidation (Service)
Cases ....

- Additional Proprietary Cases for Each Section
  - Process Analysis: Mathews Mug and Muffins, Tenafly Bagel, Violet Film Processing
  - Time to Market: Toy City
  - Waiting Line: New England Island Air
  - Inventory: The Nut Case
  - Aggregate Planning: TCB Check Processing
Capabilities - Solutions

- Solutions for all Proprietary Cases
- Solutions/Enhancements for Popular Cases
  - Kristen’s Cookie Co.
  - Donner, Co.
  - Blanchard
  - Etc.
- Solutions for Sample Problems for Irwin/McGraw Hill Texts
Software Overview

**Competitive Advantage**
- Process Improvements
- Supply Chain Management
- Capacity Management
- Responsiveness
- Quality Management

**Software Modules**
- Process Analysis
- Waiting Line Analysis
- Inventory Modeling
- Materials Requirement Planning
- Facility Location (Fall 1999)
- Forecasting
- Aggregate Planning
- CPM-PERT - Crashing
- Process Analysis
- Statistical Process Control
- Acceptance Sampling
Software Details - Process Analysis

■ Model Up to 15 Products
■ Each Product has Unique Task Sequence, Priority, and Lot Size
■ Model Several Types of Labor - General and Task Specific
■ Each Task can
  ◆ Process Jobs One at a Time, Batch, Continuous Flow
  ◆ Require a Setup in Addition to Run Time
■ Randomness Can Occur In Demand Arrivals, Processing Time
■ Job Selection -- FCFS, Set Up Saving
■ Results - Output, Capacity Utilization for Each Task and Delays Due to Labor and/or Material, Product Flow Time Distribution
Software Details - Waiting Line

- Arrival Pattern - Exponential, Erlang, General, Empirical
- Service Time Pattern - Exponential, Erlang, General, Empirical
- Queue Joining Discipline - Random, Shortest Line, Jockey, Cyclic
- Job Selection - FCFS and SPT
- Standard Waiting Line Outputs
- Wait Time Time Distribution
Software Details - Project Management

- Critical Path Analysis
- PERT
  - Simulation
- Crashing
  - Linear Programming
- Output
  - Early/Late Start Gantt Chart Form
  - Completion Time Distribution
  - Criticality Index
Software Details - Forecasting

- Techniques Available
  - Exponential Smoothing
  - Trend Regressed
  - FIT Smoothing
  - Moving Average
  - Simple Average
  - Best of Above
  - Weighted Moving Average
  - Winter’s Method
  - Multiple Regression

- Allows for User Determination or Program Optimization of Parameters
- Allows for De-seasonalization and De-trending of Data
- Automatic Plotting of Data, Results, Deviations
- Robust Set of Statistical Measures
- Allows for MAD and Forecast Tailoring
Software Details - Inventory

- Models Available
  - EOQ -- Finite & Infinite Replenishment Rate, Quantity Discounts, Back Orders, Safety Stock
  - Joint Optimization of Order Quantity and Safety Stock
  - Periodic Review Model-- Safety Stock
  - MRP: Low Level Coding, Batching Rules (FOQ, FPQ, LTL, LUC, LTC, Silver Meal), Rescheduling/Expediting
Software Details - Aggregate Planning

- Up to Three Products
- Up to 24 Time Periods
- Hire/Fire Costs
- Finite Setup Times and Relevant Costs Between Products
- Shift Employment Minimums and Maximums
- Lost Sales, Subcontracting, or Stockout Costing
- Develops **Mixed Integer Optimal Solution**
- Emulates Chase and Level Production and Workforce Strategies
- Variable Length of Time Periods Allowed
Software Details -- Quality Management

- **Statistical Process Control**
  - Sampling by Variables (\( \bar{X}, R, s \) charts)
  - Sampling by Attributes (\( p, np, c, u \) charts)
    - Several Statistical Tests

- **Acceptance Sampling**
  - OC Curve
  - Determination of Sampling Plan
Future

- Supply Chain Management
- Enhance Process Management
- Scheduling
- Real Time Process Visualization
- Visit: http://www.stern.nyu.edu/HOM