Title: Week 1 Problem Definition Worksheet

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1. Problem Statement: Define your problem. What pains are you (or your customers, family, clients, etc.) experiencing? What is broken, wrong or not working? How do you know that you have a problem? What is telling you this? What is your evidence?
   1. A process exists to generate feature extraction reports for data collection to support downstream machine-learning applications. This process extracts features from CAD models using a software tool and requires manual input by engineers to facilitate the process. The engineer's time is limited to a standard 8-hour workday, per union regulations, and this project seeks to minimize touch-time whilst achieving the minimum throughput objective of 5,000 models per day.
   2. Models are processed in batches. Batches can vary in the number of models and can be controlled in this experiment. The above target is based on a batch size of 1,000 models (i.e. 5 batches per day).
   3. Pain points made evident by feedback from the team and fluctuating daily throughput:
      1. Individuals have to constantly manage the process.
      2. Process needs structuring to allow for more focus on other work.
      3. Lack of progress, both in this activity and other work, due to capacity constraints.
      4. Daily throughput is inconsistent and as a result weekly targets are not always met.
2. Business Impact: Why should you fix this problem? What is the estimated benefit for solving this problem? What is this problem worth in dollars? How will you measure success? What is your key output (y)?
   1. The engineer should be spending the majority of their daily time on more complex work statements rather than this activity.
   2. The response variable for measuring success is the ratio of daily throughput to total engineer touch-time. Daily throughput is measured by models processed per day. Total engineer touch-time is measured in seconds.
   3. This experiment will use a labor rate of $100 per hour. Touch-time per batch has been measured at 774 seconds (13 minutes). Based on this information, the engineer spends 2% of their daily time on a single batch ($24). At the target rate specified for daily throughput, the cost is approximately $120 per day.
   4. Success will be measured by defining the optimal parameters and parameter values that increase the response variable.

1. Goals: What are your improvement objectives, goals or targets? How much “better” do you want to be? Quantify this goal.
   1. Success will be measured by a 10% increase in the response variable while maintaining or exceeding the target rate of 5,000 models processed per day.

1. Project Scope: What are your boundaries? What is the first step and last step of the process you need to fix? What is not within your scope?
   1. Project includes collection and analysis of available file information such as folder and file creation time, size, log files, and available computers. The process improvement plan includes eliminating steps in the current process and/or re-engineering the current process.
   2. The first step of the current process is batch creation and the last step is validating the generated data for consistency.
   3. Not included in the project scope is analysis of the effects this activity has on the engineer's other work statements or sourcing decisions related to this activity.

1. Team: Who is the process owner/champion? Who do you need to work with or involve to analyze and/or impact this process?
   1. I will be the process owner/champion responsible for data collection, analysis, interpretation, and presentation. I will need to work with one or two other engineers in the company who will assist in following the process.

1. Project plan: (very high-level): Estimate time (or date) per DMAIC step. Develop a rough timeline.
   1. Define: Identify the problem and the team's scope by 4/12/2019 (1 week).
   2. Measure: Develop data collection plan and implement it by 4/19/2019 (2 weeks).
   3. Analyze: Determine root causes; identify and verify critical variables by 5/17/2019 (6 weeks).
   4. Improve: Develop/select/pilot and then implement a solution by 5/24/2019 (7 weeks).
   5. Control: Put a control plan in place; ensure the problem stays fixed by 6/7/2019 (9 weeks).

1. Process Map: What are the steps in the process you are trying to fix? Document the flow of process steps (of the process you are working to improve). This should be a high-level flow chart.
   1. Run batch-creation script and record batch ID (221 seconds).
   2. If a batch is successfully created, initiate processing of batch in software tool (301 seconds).
   3. Save log file and generate report (229 seconds).
   4. Validate generated report (23 seconds).

