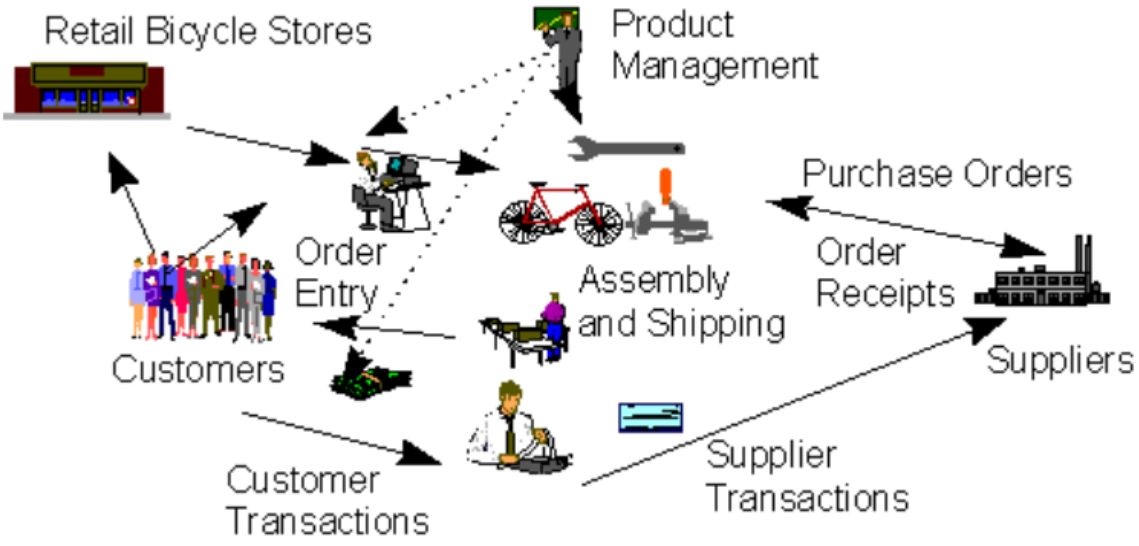
IE 0015
INTRODUCTION TO INFORMATION SYSTEMS ENGINEERING
PROJECT
SPRING 2022

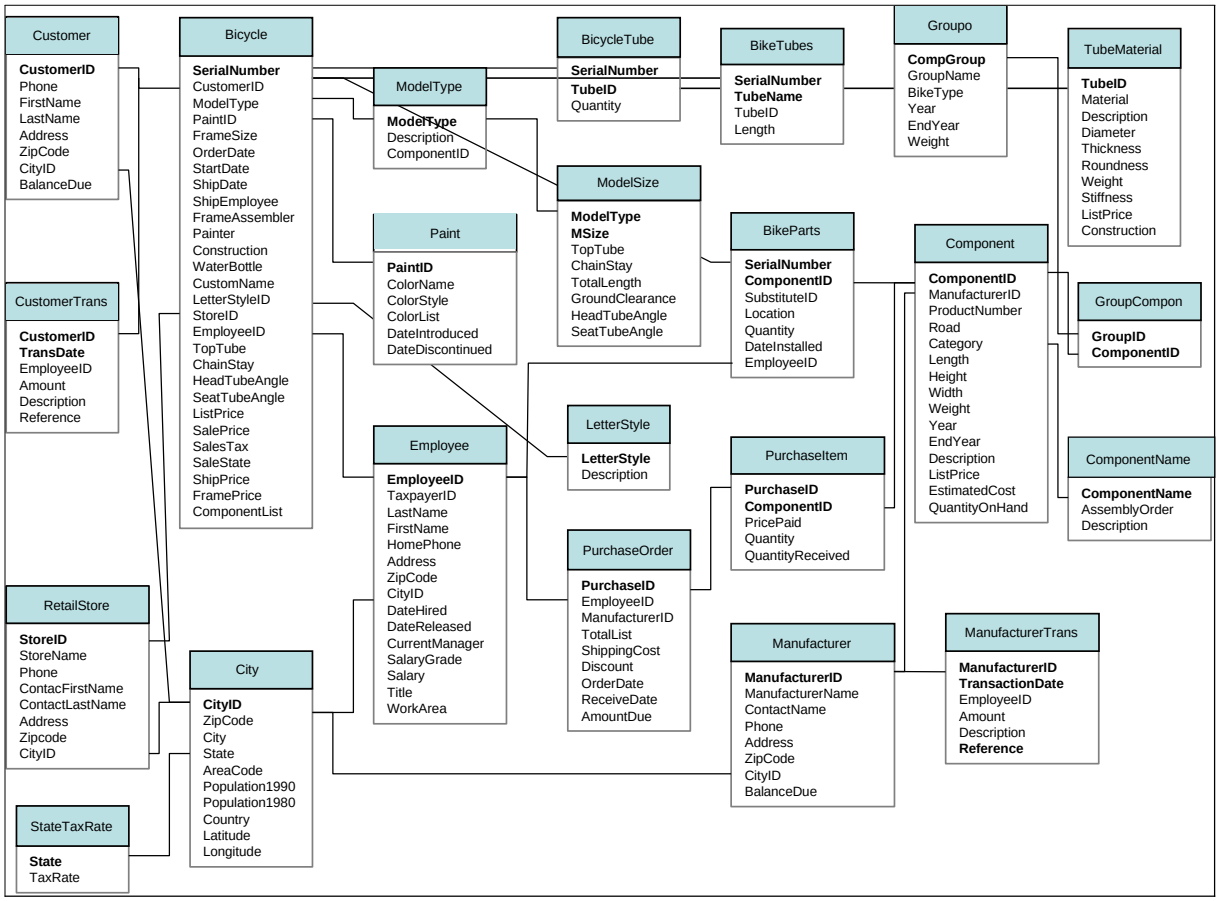
Project information

This is an individual project which will be performed by each student. The project is designed for you to link your fundamental IE knowledge to information and database systems. You will need to apply your IE knowledge to generate solutions describe in the project scenarios, which are something that you will be facing on daily bases in the industry. That is to say; your solution will be based on not only the knowledge you have learned in this course but also your fundamental IE training and general engineering knowledge that you have learned at SCUPI. You can add assumptions wherever you see appropriate.

You work as an IE engineer in Rolling Thunder Bicycles company, a small company that manufactures custom bicycles. The basic company operations are driven by customer orders. Customers can place orders directly with the company, or they can order with the assistance of a local bicycle store. Bicycles are assembled and shipped in about two weeks. Basic components of the bicycles are ordered in advance because of shipping delays (lead-time). Inventory count is maintained by the computer. As workers assemble a bicycle, they record the use of each component.



You are the information system owner of the company. Your primary job is to provide general information support to the users – everyone who is using these information systems or requires data from these systems. The simplified systems that are available for you were created with Microsoft® Access. The database schema diagram (partial) is as follows.



Although Rolling Thunder is not a large company, you will need some time to understand the systems and the database. The learning and challenges are exactly what you have to take when stepping into the industry.

Problem setting

Spring 2014, you just graduated and chose to join the Rolling Thunder Bicycle Company. As a young IE engineer, you are determined to prove yourself and are eager to apply what you have learned to make an impact on the company as well as to society. Here are your chances:

Scenario 1 (Identifying root cause for quality issues and estimate overall cost)

Customer Service Department has received over a dozen customer complaints, regarding the quality issues of the frame of their bicycles. The customers claimed that their bicycles' frame could "break" under normal usage. Fortunately, no one gets hurt. VP of Quality Control suspects that it is an internal quality issue and hope you can help identify the possible root cause from the data perspective. VP of Product Management (sometimes refered as R&D) Department pointed out that this is an urgent case since it might lead to customer injury. Therefore, the VP of Customer Service requested your help to, based on

your findings, provide further information to help him take appropriate measurements for this case (e.g., callback). VP of finance is very concerned about the possible cost accrued from the above measurements and are asking you to provide her with an estimation of the overall cost if products should be recalled and replaced. Attached below is a list of customers from whom the CS has received complaints.

Customer ID
26160
40505
29577
40579
18043
41008
2281
40791
40686
40539
875
288
40523
29422
40796

Scenario 2 (Forecasting for capacity expansion)

A new sales VP has just got onboard, approximately the same time as you. She is famous in your industry for being very demanding, and you soon find that she lives up to her reputation. She called upon your help to provide her with information for setting up market strategy and making the market forecast. She would like to have the sales trend (by sales amount and/or by sales quantity), from 1999 to 2013. You can define what are the dimensions (e.g., by bicycle model, by color, by state) you would like to use and in what granularity (e.g., by year, by month, by week, by date) to give her the information. You can generate multiple tables/reports for her.

Scenario 3 (Ad hoc problem solving)

You got a phone call from the California State Police. There has been an accident on the road involving a bicycle rider who right now is hospitalized and unconscious. The police need to contact the bicycle rider's family urgently, but the rider has no ID with him, which leads the police to believe that he lives not very far away (here means in the State of California). The bicycle, with serial number unidentifiable due to the accident, is a white Rolling Thunder road bike. Judged from the condition, the bicycle should be purchased between 1998 to now. What is the information you can provide to the police based on the current information that is available to you? What is the further information that you would

want to get from the police to help the investigation (e.g., how to reduce the number of results)? List according to your priority.

Scenario 4 (Cost, delivery, and continuous improvement)

The business objective cascaded from the CEO this year is to cut the cost companywide by 8% and improve customer service by reducing average delivery lead time. IE's are the default production cost (productivity) and delivery lead time (scheduling) owner. Based on your IE training, you need to analyze the data on hand and find the best opportunities for cost reduction and lead time improvement. You looked into the data and found that not very surprisingly, the data are not 100% accurate (for example, the inventory data) and not sufficient. Propose your way to use available data (might be limited) to reach the objective. Also, propose further data acquisition points (what data to collect) in the company so that you can further reduce cost and delivery lead time in the future.

Report and presentation

This project will be performed by the individual. Report and presentation are of course the same. The project report and presentation material will be due at 12:00 noon on Monday, May 9th. Reports and presentation material should be uploaded to BlackBoard by the due date. No late submission will be accepted. A hard copy is only required as requested. All reports should be within 15 pages (extra information such as the raw data file can be attached in appendixes), and everyone will give a 2 minutes presentation by week 12 (section 1, Tuesday, May 10th and section 2, Wednesday, May 11th) during class. A schedule will be provided to you and you will not join other students presentation. The schedule will be tight so your presentation time will be controlled strictly.

Evaluation

Evaluation of the project will be based on both the presentations and the written reports. You need to writhe the SQL for retriving the data and analyse the data to support your findings, determine your solution, and lead to the conclusions in your report. The purposes/reasons to link between your data analysis and your findings, solutions, and conclusions need to be clearly stated base on your IE knowledge. This is equally important as the data analysis since you are first and foremost, an IE engineer.

To actually run the SQL in the database and generate the data and report will be a plus. However, you will need to notice that SQL supported by Microsoft® Access might be slightly different from the textbook that we are using for this course. This is, again, exactly what you will have to face in the industries while systems do not always follow a universal standard.