CSCI 4140 Advanced Database Systems

Assignment 1

Learning Outcomes

- Analyze user requirements for ER modeling
- Demonstrate competence in using client DB software (e.g., MySQL Workbench) in ER modeling for DB design
- Use DB triggers and stored procedures

Context for Application Requirements

There is a company, say a company called X, that sells parts. The company provides a UI for the client companies to make purchase orders for parts. Your task is to create an ER model for data requirements to support the ordering of parts using purchase orders and to create a DB from your ER model.

Data Requirements

Consider a company that produces and sells products that are stored in a warehouse. The company receives orders for its products from clients using purchase orders (POs).

The company needs to keep track of the following information about parts that they sell:

- *partNo* … unique (PK)
- *partName*
- *partDescription*
- *currentPrice*
- *QoH*... quantity of a part in stock (referred to as Quantity on Hand (QoH))

Information that needs to be known about clients:

- *clientId* … ID of the client comp
- *clientName*
- *clientCity*
- *clientCompPassword*
- *dollarsOnOrder*
- *moneyOwed*
- *clientStatus*

Information about purchase orders (POs)

- *poNo* …
- *clientID* … ID of the client comp.
- *datePO* … date of the purchase order
- *status*

Each PO has a number of lines, each one denoting an order for a number of units of a specified part identified by a part number. Thus, for each part, the part number and its price need to be stored together with the quantity on order. Lines are assigned unique numbers starting at one for the first line, 2 for the second, and so on. As prices for parts are subject to change, the purchase price for each part on an order line must be stored in the DB along with the purchase order. The reason is that the purchaser views a specific price for a specific part and orders that part under the assumption that the price$1.00. However, if by the time the purchase order is received by the supplier, the price for the part that the purchaser ordered (expecting to pay $1.00) has increased to $2.00, the purchaser may not be willing to pay more that the expected price of $1.00.

Note that information about the client includes attributes of *clientStatus* and *clientPassword*. These attributes are not used in the current assignment. Neither is the attribute *status* for the purchase order.

Requirements

ER Model

- Create an ER model for the data requirements and expected usage of the data. Use your tool to produce a text file that contains the SQL script for creating the tables your ER model.

- Create SQL statements that insert sample DB content.
- Create an example trigger and an example stored procedure. You may create your own trigger and a stored procedure or you may use a trigger and procedure for the following purposes:
  - Your trigger may be specified for insertion of a newline into the purchase order (insertion of a tuple representing an order of a part, in a specified quantity and a specific price). Your trigger should update the *money owed* by a client by the dollar value of the part being inserted (*moneyOwed := moneyOwed + (partPrice * qty))*, where the *partPrice* and *qty* refer to attributes of the newly inserted tuple).
  - Your stored procedure may retrieve the current price for a part, given the part's ID.

Additional Requirements

- Naming Conventions: This is a hard requirement – if you do not satisfy this requirement, you will get a zero!
  - Your DB must be such that the names of your tables and the columns must end with the last three digits of your student ID.
  - In your software, the names of your methods/functions/procedures/variables must end with the last three digits of your student ID and the same applies to any parameter of a method/procedure/function. In other words, any identifier you use should end with the last three digits of your ID.

- You may use the FCS software infrastructure, e.g., the FCS DB server/software, or you may use your own software that could be cloud-based or your locally installed software. Instead of the MySQL Workbench, you may use some other client-DB software that supports ER modeling.
  - Note: Keep in mind that the MySQL Workbench will not work properly to generate the script file automatically for the target DBMS when using the FCS Maria DB server. However, you can copy from the Workbench the text of DB script to crate the tables.

Submission requirements

Your submission should have the usual packaging (front page, TOC (Table of Contents), etc.) and contain the following information:

- Section describing your ER model developed with MySQL Workbench (or some other ER modeling software, including:
  - ER model/diagram and a list of relationships that also includes their min/max cardinalities for each one
  - SQL scripts to create DB tables as created by Workbench (or some other ER modeling software)

- SQL script files for your
  - Trigger
  - Stored procedure
  - SQL statements to input sample tuples into the DB tables (information about clients and parts)

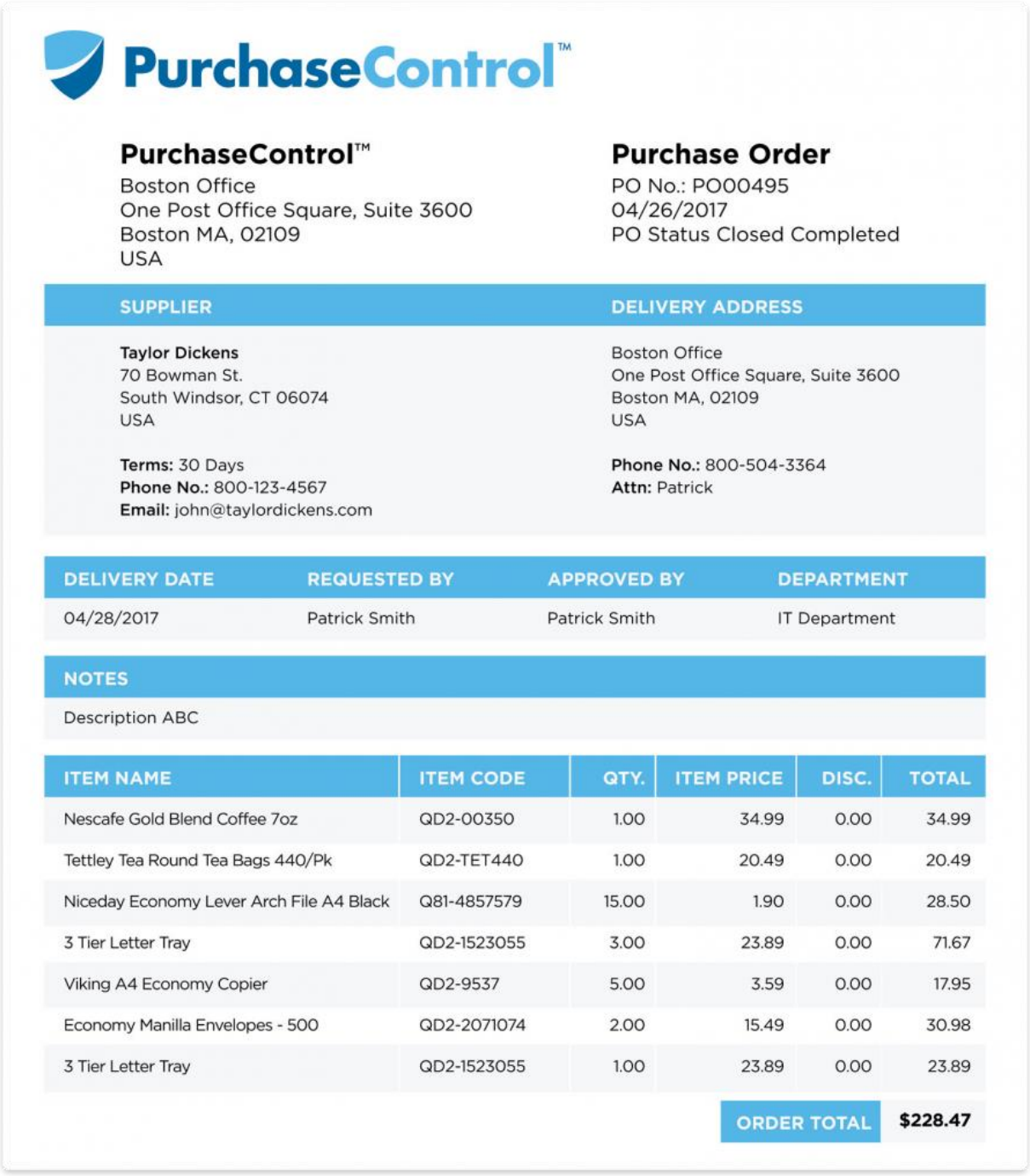
- Screenshots that demonstrate that your software works
  - Trigger … before and after screenshots
  - Stored procedures … invocation and result
  - SQL statements to insert tuples into tables … screenshots of results

Your screenshots should be incorporated in your submission document and should be annotated to guide the marker in understanding figures/screenshots in terms of what it is being demonstrated.

For an appeal of your grade on this assignment, see instructions in the syllabus.

Appendix: Examples of Purchase Orders

Purchase orders and DB design to support them are discussed in class in Week 2.



PurchaseControl™

PurchaseControl™
Boston Office
One Post Office Square, Suite 3600
Boston MA, 02109
USA

Purchase Order
PO No.: PO00495
04/26/2017
PO Status Closed Completed

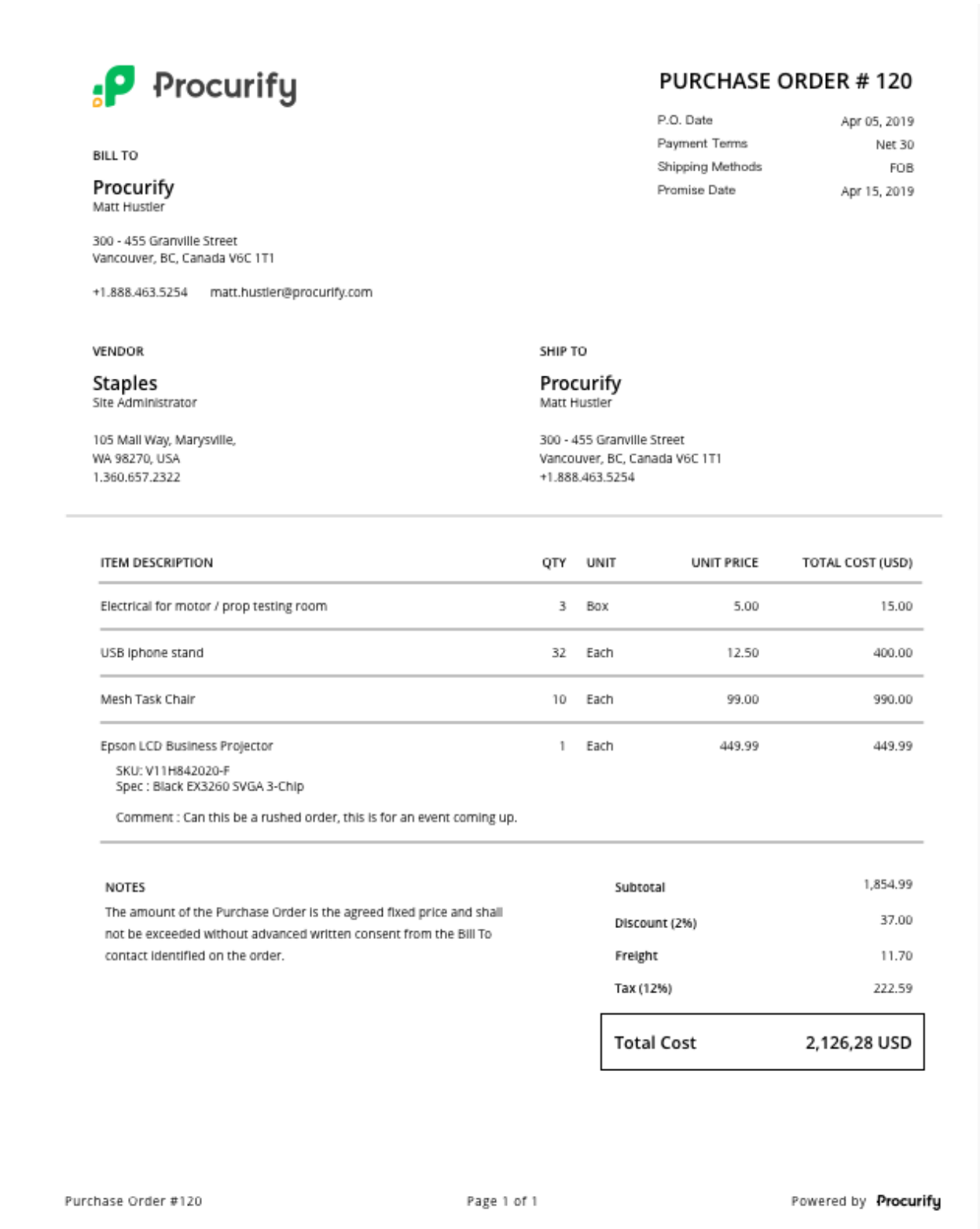
SUPPLIER	DELIVERY ADDRESS
Taylor Dickens 70 Bowman St. South Windsor, CT 06074 USA **Terms:** 30 Days **Phone No.:** 800-123-4567 **Email:** john@taylordickens.com	Boston Office One Post Office Square, Suite 3600 Boston MA, 02109 USA **Phone No.:** 800-504-3364 **Attn:** Patrick

DELIVERY DATE	REQUESTED BY	APPROVED BY	DEPARTMENT
04/28/2017	Patrick Smith	Patrick Smith	IT Department

NOTES
Description ABC

ITEM NAME	ITEM CODE	QTY.	ITEM PRICE	DISC.	TOTAL
Nescafe Gold Blend Coffee 7oz	QD2-00350	1.00	34.99	0.00	34.99
Tettley Tea Round Tea Bags 440/Pk	QD2-TET440	1.00	20.49	0.00	20.49
Niceday Economy Lever Arch File A4 Black	Q81-4857579	15.00	1.90	0.00	28.50
3 Tier Letter Tray	QD2-1523055	3.00	23.89	0.00	71.67
Viking A4 Economy Copier	QD2-9537	5.00	3.59	0.00	17.95
Economy Manilla Envelopes - 500	QD2-2071074	2.00	15.49	0.00	30.98
3 Tier Letter Tray	QD2-1523055	1.00	23.89	0.00	23.89
				ORDER TOTAL	$228.47

Source: https://monday.com/blog/wp-content/uploads/2021/07/pasted-image-0-68.png



Procurify

PURCHASE ORDER # 120

P.O. Date Apr 05, 2019
Payment Terms Net 30
Shipping Methods FOB
Promise Date Apr 15, 2019

BILL TO

Procurify
Matt Hustler

300 - 455 Granville Street
Vancouver, BC, Canada V6C 1T1

+1.888.463.5254 matt.hustler@procurify.com

VENDOR

Staples
Site Administrator

105 Mall Way, Marysville,
WA 98270, USA
1.360.657.2322

SHIP TO

Procurify
Matt Hustler

300 - 455 Granville Street
Vancouver, BC, Canada V6C 1T1
+1.888.463.5254

ITEM DESCRIPTION	QTY	UNIT	UNIT PRICE	TOTAL COST (USD)
Electrical for motor / prop testing room	3	Box	5.00	15.00
USB iphone stand	32	Each	12.50	400.00
Mesh Task Chair	10	Each	99.00	990.00
Epson LCD Business Projector SKU: V11H842020-F Spec : Black EX3260 SVGA 3-Chip Comment : Can this be a rushed order, this is for an event coming up.	1	Each	449.99	449.99

NOTES

The amount of the Purchase Order is the agreed fixed price and shall not be exceeded without advanced written consent from the Bill To contact identified on the order.

Subtotal	1,854.99
Discount (2%)	37.00
Freight	11.70
Tax (12%)	222.59
Total Cost	**2,126,28 USD**

Purchase Order #120 Page 1 of 1 Powered by Procurify

Source: https://blog.procurify.com/app/uploads/2013/09/Purchase-Order.png