Case Study Modular Synth Store

Version 1.2, September 9th, 2019

This case study offers students the opportunity to practice their verbalization skills, their ER modelling skills and their interview techniques. Students are tasked with developing an information system for the fictitious company "Modular Synth Store". This information system is to hold information on all the different products this store sells. The goal is to create a database that can be used to look up information on what is needed to stock the store and to provide information to customers on which products are available (or can be ordered in case they are out of stock).
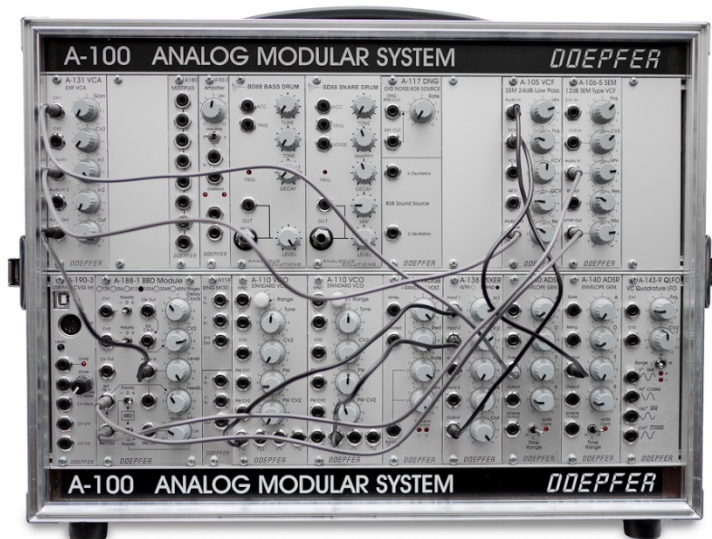
For students and teachers
Introduction

Figure 1 By Nina Richards (who can be contacted via ZoeB). - Original photo by Nina Richards, CC BY 3.0, https://commons.wikimedia.org/w/index.php?curid=19534327

Modular Synth Store is a store that sells parts and components for so called "modular synthesizers". A modular synthesizer is a synthesizer (electronic music instrument) that is built up from separate parts that musicians need to connect using so called "patch cables" to create their sounds. These separate parts are commonly called "modules" and modules need to be housed in specialized enclosures (so called "cases"). For both cases and modules the horizontal width is measured in HP ("horizontal pitch") units. Cases provide space for one or more rows of modules (all modules always have the same height) and need to be equipped with a power supply to power the individual modules.

Modular Synth Store aims to offer everything modular synthesizer fans need for their hobby: modules, cases, power supplies and patch cables. A significant number of modules are sold

in the form of kits that need to be assembled by the user with the help of a soldering iron. For this reason Modular Synth Store also sells electronic tools and components.

Finally Modular Synth Store offers starter sets that contain everything that is needed to set up a working modular synthesizer. These sets usually contain a case, a power supply, a few modules and some patch cables.

Note that Modular Synth Store currently only sells to customers that visit their store in person. There are no plans to open an online store in the foreseeable future as there are already plenty of other online outlets for modular synthesizer equipment. Customers make the journey to the Modular Synth Store not only to purchase equipment but also for advice or, simply, for a pleasant chat.

Example invoices

Date	20-11-2018	Invoice No		160154	
Customer	Dieter Carlos				
Code	**Description**	**Price**	**Qty**		**Sub total**
C1380a	Doepfer Low cost case 1 row	€ 140.50	1		€ 140.50
A-191	Doepfer MIDI to CV converter	€ 90.99	1		€ 90.99
G19B12	MFB Simple oscillator	€ 99.95	2		€ 199,90
1920-0921	Befaco 4 Channel Mixer	€ 120.15	1		€ 120.15
HXKJ-134	Intellijel Quad VCA	€ 239.95	1		€ 239.95
A-124	Doepfer Wasp Filter	€ 85.00	1		€ 85.00
G18B51	MFB Dual LFO	€ 110.00	1		€ 110.00
MC-30-S	Patch cables 30 cm (set 5 pcs)	€ 9.99	1		€ 9.99
TOTAL					**€ 996.48**
All prices include 21% VAT!					

Date	14-03-2019	Invoice No		172014	
Customer	Bob Smith				
Code	**Description**	**Price**	**Qty**		**Sub total**
1499083-89/B	RYO Amp Mix Kit PCB Only	€ 24.99	1		€ 24.99
87190321001	SCI Pot meter mono 10KOhm	€ 1.72	4		€ 6.88
88912003991	RoyalOhm Resistor 330KOhm 100pc	€ 1.79	1		€ 1.79
…	…	…	…		…
…	…	…	…		…
B0091882991	Stannol HS 10 Soldering lead 250G	€ 14.95	1		€ 14.95
TOTAL					**€ 139.55**
All prices include 21% VAT!					

Example product data

Product name	Doepfer Low Cost Case 2 Rows
Product code	C1380b
Product variant	
Product type	Case
Manufacturer	Doepfer GmbH, Geigerstr. 13 D-82166 Gräfelfing / Deutschland Phone: +49 89 89809510 Fax: +49 089 89809511 Email: sales@doepfer.de
Description	The Doepfer Low Cost Case 2 Rows is a simple 2 row case that includes a power supply with 24 connections for modules.
Product notes	
Purchase price	€ 180.95
Selling price	€ 249.99

Product name	MFB Simple Oscillator
Product code	G19B12
Product type	• Oscillator module • LFO module
Manufacturer	MFB GmbH, Marconistr. 24 D-12166 Berlin / Deutschland Tel: 030/801 56 52 Fax: 030/802 36 13 Email: info@mfberlin.de
Description	The MFB Simple Oscillator is an oscillator that offers triangle and saw wave output. Octave range 0.1 KHz – 10KHz.
Product notes	
Purchase price	€ 45.99
Selling price	€ 99.95

Product name	RYO Amp Mix
Product code	1499083-89
Product variant	C
Product type	• Amplifier • Mixer
Manufacturer	Ljunggren Audio, Becksjudarvägen 4A 660 64 Smorbrod / Sweden Email: info@ljunggrenaudio.com
Description	A 4 channel amplifier mixer.
Product notes	Pre-built
Purchase price	€ 55.99
Selling price	€ 89.95

Product name	RYO Amp Mix
Product code	1499083-89
Product variant	A
Product type	• Amplifier • Mixer
Manufacturer	Ljunggren Audio, Becksjudarvägen 4A 660 64 Smorbrod / Sweden Email: info@ljunggrenaudio.com
Description	A 4 channel amplifier mixer.
Product notes	Full DIY kit
Purchase price	€ 15.99
Selling price	€ 49.95

Product name	RYO Amp Mix
Product code	1499083-89
Product variant	B
Product type	• Amplifier • Mixer
Manufacturer	Ljunggren Audio, Becksjudarvägen 4A 660 64 Smorbrod / Sweden Email: info@ljunggrenaudio.com
Description	A 4 channel amplifier mixer.
Product notes	PCB Only kit
Purchase price	€ 9.99
Selling price	€ 24.99

Product name	RoyalOhm Resistor 330KOhm 100pc
Product code	88912003991
Product variant	
Product type	• Component
Manufacturer	Royal Ohm 20/1-2 Moo 2, Klong Na, Muang, Chachoengsao 24000, Thailand. Phone: +66 38 517 332 Email: export@royalohm.com
Description	
Product notes	
Purchase price	€ 0,29
Selling price	€ 1,79

Your task

Your task is to draw up a data model for an information system that holds information on all the different products this store sells. It is also desirable to store invoice data, but it is emphatically NOT required to develop an e-commerce system for selling modules. Neither does Modular Synth Store at this moment intend to start storing customer data as this would imply having to conform to complicated GDPR regulations. What it needs is a system for storing details on all the modules and other products it sells.

To develop such a system you should:

Course DMDD wk 2 - 3
1. Study the documentation provided ("For students and teachers").
2. Attempt to verbalize all the facts you can find in the provided documentation. If something is unclear to you, make a note of it. You will need to ask the customer about this during the interview. Your goal is to be able to create a complete set of verbalizations after you have finished the interview.

Course Professional Skills wk. 2 - 3
3. Use the 'DROP-formulier' to prepare the interview.
4. Make sure that roles (moderator, side-kick, note taker) are explicit in your team.
5. Ensure a clear structure of the interview (introduction, core, closing).
6. Interview the customer by using conversation techniques studied in PS-lessons as listening, summarize and ask questions. Show your communication skills both verbally and non-verbally. Make sure you get answers to all of the questions you wrote down in step 2.
   Interviews can take no more than 30 minutes.
7. Afterwards reflect on your own actions. Make notes for later use to formulate your learning objectives
8. In week 4 you will receive feedback from your Professional Skills teacher.

   Hint: use the interview to ask the customer for missing information. It is also a good idea to use this opportunity to verify your verbalizations. If all goes well, you should leave the interview with a complete set of concrete examples of facts.

Course DMDD wk. 4 - 5
9. Using the input from the customer finish verbalizing the facts, making sure they cover all the business processes of the Modular Synth Store.
10. Request feedback on your verbalizations from your DMDD teacher. **Make sure you have received a passing mark for rubric element "Verbalizations".**
11. Use the verbalizations to draw up an ERD. Make sure to note any design decision you have made in doing so.
12. Transform the ERD to a PDM, again writing down any design decision you have made.
13. Discuss your work with at least one other team. Make sure you receive a rubric document with grades and recommendations from them. In return you are to provide them with a rubric document where you evaluate their work.
14. Finally hand in your work on iSAS. You are to hand in a functional design document (FO), a technical design document (TO) and the rubric document you received in step 13.