# FINAL EXAM

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## Question 2

### Q2.1.

We translate the **Manufacturer** entity first. Since this is a normal entity, the translation yields

**Manufacturer**(<u>name</u>: text, country: text)

Next, we translate **Component**. Since **Component** is a weak entity of **Manufacturer**, the translation yields

**Component**(<u>mname</u>: text, <u>id</u>: numeric)

The primary key of **Component** is the pair (<u>mname</u>, <u>id</u>) where <u>mname</u> is a foreign key referencing **Manufacturer**.

Then, we can translate **Computer**. We can use the general-purpose ER-method to translate the ISA, as the ER-method is a good default choice. Note that **Computer** is also a weak entity of **Manufacturer**. The translation yields

**Computer**(<u>mname</u>: text, <u>model</u>: text, price: numeric)

**Laptop**(<u>mname</u>: text, <u>model</u>: text, battery_capacity: numeric, screen_size: numeric)

**Desktop**(<u>mname</u>: text, <u>model</u>: text, all_in_one: boolean),

in which <u>mname</u> in **Computer** is the foreign key referencing **Manufacturer**, the pair (<u>mname</u>, <u>model</u>) in **Laptop** is a foreign key referencing **Computer**; and the pair (<u>mname</u>, <u>model</u>) in **Desktop** is a foreign key referencing **Computer**.

Finally, we translate the many-to-many relationship *part* between **Component** and **Computer**

**Part**(<u>cpn_mname</u>: text, <u>cpn_id</u>: numeric, <u>cpt_mname</u>: text, <u>cpt_model</u>: text),

in which the pair (<u>cpn_mname</u>, <u>cpn_id</u>) in **Part** is a foreign key referencing **Component** and the pair (<u>cpt_mname</u>, <u>cpt_model</u>) in **Part** is a foreign key referencing **Computer**.

Additionally, the constraint that laptop and desktop are distinct products must hold. Hence, any pair (<u>mname</u>, <u>model</u>) in **Laptop** cannot occur in **Desktop** and vice versa. Furthermore, since not all computers are laptops or desktops, not every pair (<u>mname</u>, <u>model</u>) in **Computer** must also be either in **Laptop** or **Desktop**.

### Q2.2.

See above (the primary keys are underlined).