**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**(name: text, country: text)

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

**Component**(mname: text, id: numeric)

The primary key of **Component** is the pair (mname, id) where mname 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**(mname: text, model: text, price: numeric)

**Laptop**(mname: text, model: text, battery\_capacity: numeric, screen\_size: numeric)

**Desktop**(mname: text, model: text, all\_in\_one: boolean),

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

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

**Part**(cpn\_mname: text, cpn\_id: numeric, cpt\_mname: text, cpt\_model: text),

in which the pair (cpn\_mname, cpn\_id) in **Part** is a foreign key referencing **Component** and the pair (cpt\_mname, cpt\_model) in **Part** is a foreign key referencing **Computer**.

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

**Q2.2.**

See above (the primary keys are underlined).