Fall 2024 Midterm Test
Solutions V1
CSC 343 H1F
Duration: **90 minutes**

Question 1. [11 marks]

Consider the following schema, which represents manufacturers who make parts and customers who order those parts. For example, the tuple `<4, M1, 'Widget'>` in Part and the tuple `<M1, 'XYZ Corp'>` in Manufacturer means that the XYZ Corp makes a part called a Widget with ID 4. The tuples `<1111, 4, C1>` and `<1112, 4, C2>` in Order represent two customers with IDs C1 and C2 who ordered that part.

Relations

Manufacturer(<u>mID</u>, name)
Part(<u>pID</u>, mID, name)
Customer(<u>cID</u>, email)
Order(<u>oID</u>, pID, cID)

Integrity Constraints

1) Part[mID] $\subseteq$ Manufacturer[mID]
2) Order[pID] $\subseteq$ Part[pID]
3) Order[cID] $\subseteq$ Customer[cID]

Part (a) [1 mark] Assume there are 5 tuples in Order. What are the minimum and maximum number of tuples that could be in Customer $\bowtie$ Order? If no maximum, write ∞.

Min: 5 Max: 5

Part (b) [1 mark] Assume there are 5 tuples in Customer. What are the minimum and maximum number of tuples that could be in Customer $\bowtie$ Order? If no maximum, write ∞.