

Reasonable assumptions with related answers are accepted

Department

<u>Depart_ID</u>	Model	Capacity	Hospt_ID
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Procedure

<u>Proc_ID</u>	Duration	Risk factor	Depart_ID	Hospt_ID
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Hospital

<u>Hospt_ID</u>	Name	Address
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Doctor

<u>License_ID</u>	Name	Certification	Hospt_ID
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Patient

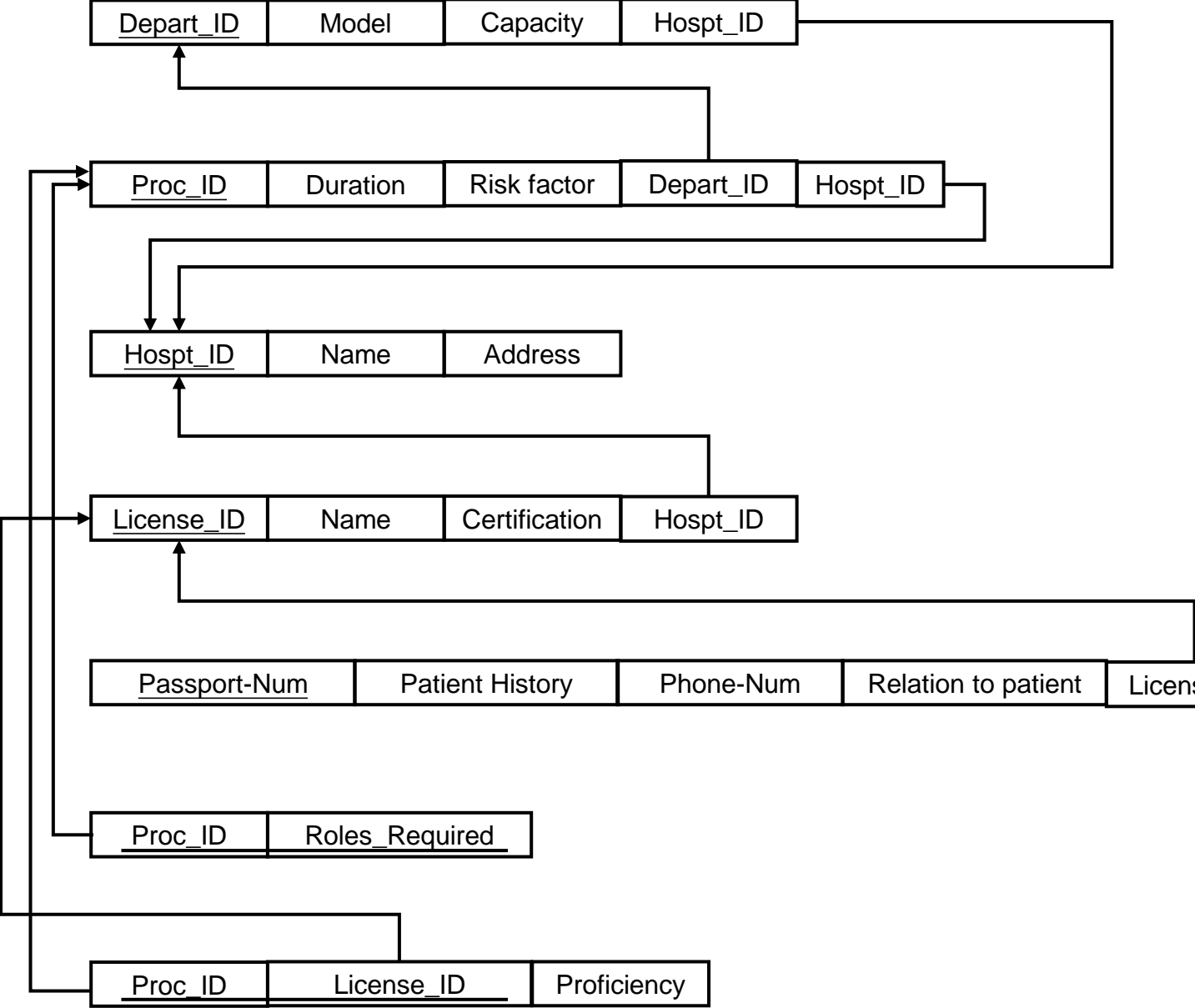
<u>Passport-Num</u>	Patient History	Phone-Num	Relation to patient	License_ID
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Roles Required

<u>Proc_ID</u>	<u>Roles_Required</u>
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Perform

<u>Proc_ID</u>	<u>License_ID</u>	Proficiency
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$$\text{Q3 (1)} \quad R = \pi_{\{bName\}}(\sigma_{(aName='Shaun Tan' \text{ AND } year > 2000)}(Book \bowtie Writes \bowtie Author))$$

$$\text{Q3 (2)} \quad R_1 = \pi_{\{rID\}}(\sigma_{(COUNT(bID) > 50)}(\gamma_{rID, COUNT(bID)}(\sigma_{(year=2021)}(Reader \bowtie Reads))))$$

$$R = \pi_{\{rName\}}(R_1 \bowtie Reader)$$

$$\text{Q3 (3)} \quad R_1 = \pi_{\{bID\}}(\sigma_{(genre='Tragedy')}Genre)$$

$$R_2 = \pi_{\{bID\}}(\sigma_{(genre='Novella')}Genre)$$

$$R_3 = \pi_{\{bID\}}(\sigma_{(COUNT(aID) > 1)}(\gamma_{bID, COUNT(aID)}(\sigma_{(aName='John Steinbeck')} (Author \bowtie Write))))$$

$$R_4 = R_3 - (R_1 \cap R_2)$$

$$R = \pi_{\{bName\}}(R_4 \bowtie Book)$$

$$\text{Q3 (4)} \quad R_1 = \pi_{\{aID\}}(\sigma_{(page \leq 400 \text{ AND } nationality='French')} (Book \bowtie Writes \bowtie Author))$$

French aID who wrote short books

$$R_2 = \pi_{\{aID\}}(\sigma_{(page > 400 \text{ AND } nationality='French')} (Book \bowtie Writes \bowtie Author))$$

French aID who wrote full-length books

$$R_3 = R_2 - R_1$$

French aID who only wrote full-length books

$$R_4 = \pi_{\{bID\}}(\sigma_{(COUNT(rID) > 1000)}(\gamma_{bID, COUNT(rID)} Reads))$$

bID which has more than 1000 readers

$$R_5 = \pi_{\{aID\}}(R_4 \bowtie Writes)$$

aID who wrote at least one book that has more than 1000 readers

$$R = \pi_{\{aName\}}((R_3 - R_5) \bowtie Author)$$

the answer