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Worksheet - Normalisation

Transformation to First Normal Form

1. Identify the primary key for the following non-normalised table

Student Name	Phone Number	Exam	Exam Mark	Pass Mark	Grade	Exam1	Exam2
Joe Bloggs	02083382991	French Japanese	59 63	50 50	C B		
Stuart Pierce	0774828382	French English	28 55	45 50	F C		
Janet Ellis	02299382111	English Maths	66 83	50 50	B A		
Leo Zimmerman	02084349291	Maths French	95 79	50 50	A A		

2. *Update:* From the table, can you determine which grade relates to which exam? What happens when you try to update Stuart Pierce's grade for English (write the SQL to do this)?
3. *Insert:* In this table, what would happen if the students had taken three exams rather than two?
4. *Delete:* What happens if we don't yet know the second exam taken by Janet Ellis and we need to delete the Maths exam and its related marks (write the SQL to do this)?
5. To overcome this problem, transform the data into first normal form. Assume that the left hand Grade column refers to the left exam column and so on.

Transformation into Second Normal Form

Student Name	Phone Number	Exam	Exam Mark	Pass Mark	Grade
Joe Bloggs	02083382991	French	59	45	C
Stuart Pierce	0774828382	French	28	45	F
Janet Ellis	02299382111	English	66	50	B
Leo Zimmerman	02084349291	Maths	95	50	A
Joe Bloggs	02083382991	Japanese	63	50	B
Stuart Pierce	0774828382	English	55	50	C
Janet Ellis	02299382111	Maths	83	50	A
Leo Zimmerman	02084349291	French	79	45	A

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1. What is the primary key for this table, which is in first normal form?
2. *Update:* What happens if we need to modify the contact phone number for Joe Bloggs?
3. *Insert:* How do we add pass mark information for an exam which no students have yet taken?
4. *Delete:* What happens if you delete information about the exams taken by Joe Bloggs?
5. To overcome these problems, transform the above data from First Normal Form into Second Normal Form.

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Normalisation – Second Normal Form - Answers

STUDENT

Student Name	Phone No.
Joe Bloggs	02083382991
Stuart Pierce	0774828382
Janet Ellis	02299382111
Leo Zimmerman	02084349291

EXAM

Exam Name	Pass Mark
French	45
English	50
Japanese	50
Maths	50

STUDENT_EXAM

Student Name	Exam Name	Exam Mark	Grade
Joe Bloggs	French	59	C
Stuart Pierce	French	28	F
Janet Ellis	English	66	B
Leo Zimmerman	Maths	95	A
Joe Bloggs	Japanese	63	B
Stuart Pierce	English	55	C
Janet Ellis	Maths	83	A
Leo Zimmerman	French	79	A

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