1. It is not always possible to reach both BCNF and dependency preservation.

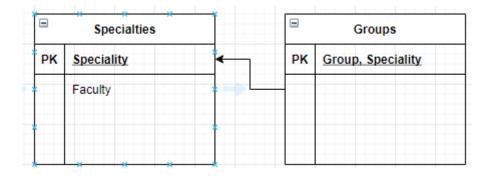
Proof: consider a relation dept_advisor(student_ID, instructor_ID, department_name) where primary key is student_ID and department_name. Here dept_name depends on instructor and instructor depends on student and department together. But instructor is not a part of primary key. Hence, this is not in BCNF. None of decomposition of dept_advisor will include all the attributes in dependency of instructor on student and department. That means, the BCNF is not dependency preserving in any case.

2.

	Student_Grades			Exams		Tutors
PK	Student_ID, Unit_ID, Date	*	PK	Unit_ID, Date	PK	Tutor_ID
	Tutor_ID	×		Tutor_ID		TutEmail
	Grade	*		Room		
				Book		
	* * *	*		Topic		

3.

Project		□ Manager		
PK Name	*	PK	Name	
Manager_name	*		Position	
Team_size				
Budget	*			



5.

PK Project, Department	DIC			
	PK	Project, Department	PK	Team_size
*		Curator		Groups
*		Team_size		

6.

- 1) BCNF. It eliminates transitive functional dependencies.
- 2) Lossless join. Removes redundancy without loss of any information.
- 3) Dependency preservation. Makes easier to test functional dependency constraints.

Examples:

Desirable types of decomposition: lossless, dependency preserving,

Undesirable: lossy, not dependency preserving.