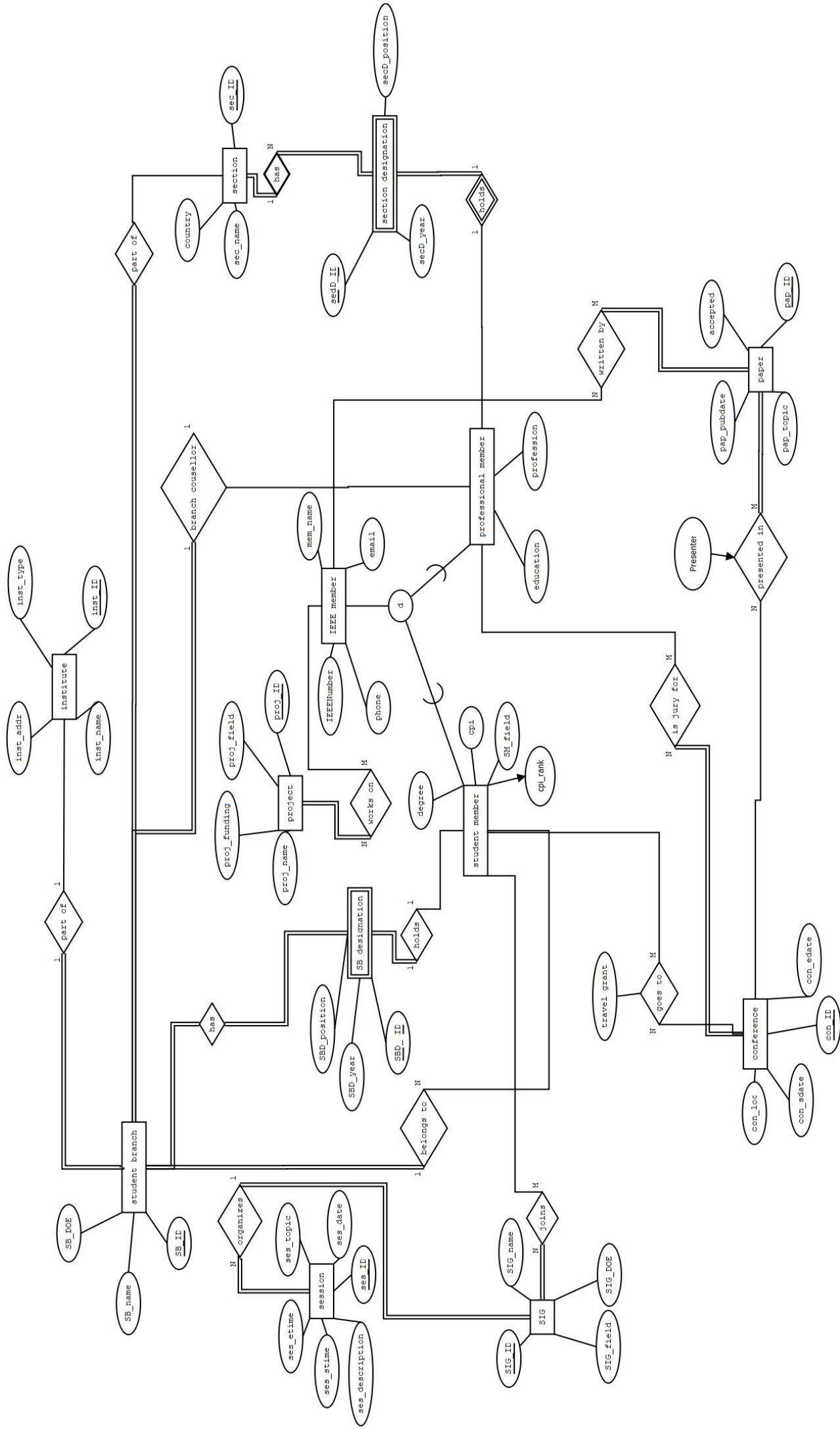
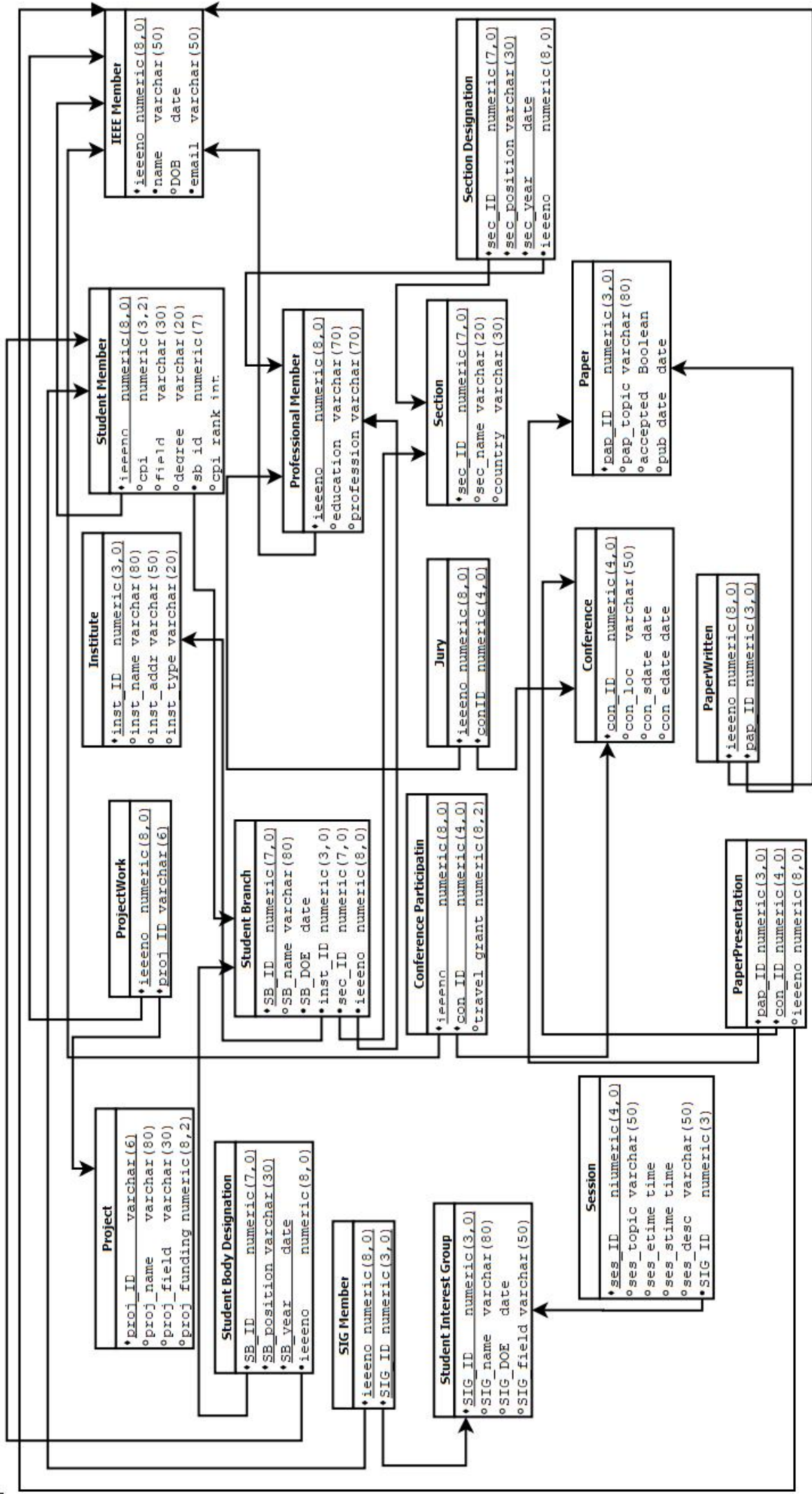


IEEE DATABASE





Relational Schema

Minimal FDs & proof that relations are in BCNF

IEEE Database

Database Management Systems Project

Assigned by: Prof. P M Jat



12th October, 2019

IEEE Member:

Attributes: IEEEENumber, name, DOB, email

Minimal FD set: $\text{IEEEENumber} \rightarrow (\text{name}, \text{DOB}, \text{email})$

$\{\text{IEEEENumber}\}^+ = \{\text{IEEEENumber}, \text{name}, \text{DOB}, \text{email}\}$

The closure of IEEEENumber includes all attributes so **IEEEENumber** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Student Member:

Attributes: IEEEENumber, CPI, field, degree, SB_ID, cpi_rank

Minimal FD set: $\text{IEEEENumber} \rightarrow (\text{CPI}, \text{field}, \text{degree}, \text{SB_ID}, \text{cpi_rank})$

$\{\text{IEEEENumber}\}^+ = \{\text{IEEEENumber}, \text{CPI}, \text{field}, \text{degree}, \text{SB_ID}, \text{cpi_rank}\}$

The closure of IEEEENumber includes all attributes so **IEEEENumber** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Professional Member:

Attributes: IEEEENumber, education, profession

Minimal FD set: $\text{IEEEENumber} \rightarrow (\text{education}, \text{profession})$

$\{\text{IEEEENumber}\}^+ = \{\text{IEEEENumber}, \text{education}, \text{profession}\}$

The closure of IEEEENumber includes all attributes so **IEEEENumber** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Section:

Attributes: sec_ID, sec_name, country

Minimal FD set: $\text{sec_ID} \rightarrow (\text{sec_name}, \text{country})$

$\{\text{sec_ID}\}^+ = \{\text{sec_ID}, \text{sec_name}, \text{country}\}$

The closure of sec_ID includes all attributes so **sec_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Section Designation:

Attributes: sec_ID, sec_position, sec_year IEEEENumber

Minimal FD set: $\{\text{sec_ID}, \text{sec_position}, \text{sec_year}\} \rightarrow (\text{IEEEENumber})$

$\{\text{sec_ID}, \text{sec_position}, \text{sec_year}\}^+ = \{\text{sec_ID}, \text{sec_position}, \text{sec_year}, \text{IEEEENumber}\}$

The closure of $\{\text{sec_ID}, \text{sec_position}, \text{sec_year}\}$ includes all attributes so **{sec_ID, sec_position, sec_year}** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Student Branch:

Attributes: SB_ID, SB_name, SB_DOE, inst_ID, sec_ID, IEEEENumber

Minimal FD set: $\text{SB_ID} \rightarrow (\text{SB_name}, \text{SB_DOE}, \text{inst_ID}, \text{sec_ID}, \text{IEEEENumber})$

$\{\text{SB_ID}\}^+ = \{\text{SB_ID}, \text{SB_name}, \text{SB_DOE}, \text{inst_ID}, \text{sec_ID}, \text{IEEEENumber}\}$

The closure of SB_ID includes all attributes so **SB_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Institute:

Attributes: inst_ID, inst_name, inst_addr, inst_type

Minimal FD set: $\text{inst_ID} \rightarrow (\text{inst_name}, \text{inst_addr}, \text{inst_type})$

$\{\text{inst_ID}\}^+ = \{\text{inst_ID}, \text{inst_name}, \text{inst_addr}, \text{inst_type}\}$

The closure of inst_ID includes all attributes so **inst_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Paper:

Attributes: pap_ID, pap_topic, accepted, pub_date

Minimal FD set: $\text{pap_ID} \rightarrow (\text{pap_topic}, \text{accepted}, \text{pub_date})$

$\{\text{sec_ID}\}^+ = \{\text{pap_ID}, \text{pap_topic}, \text{accepted}, \text{pub_date}\}$

The closure of pap_ID includes all attributes so **pap_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Conference:

Attributes: con_ID, con_loc, con_sdate, con_edate

Minimal FD set: $\text{con_ID} \rightarrow (\text{con_loc}, \text{con_sdate}, \text{con_edate})$

$\{\text{con_ID}\}^+ = \{ \text{con_ID}, \text{con_loc}, \text{con_sdate}, \text{con_edate} \}$

The closure of con_ID includes all attributes so **con_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Project:

Attributes: proj_ID, proj_name, proj_field, proj_funding

Minimal FD set: $\text{proj_ID} \rightarrow (\text{proj_name}, \text{proj_field}, \text{proj_funding})$

$\{\text{proj_ID}\}^+ = \{ \text{proj_ID}, \text{proj_name}, \text{proj_field}, \text{proj_funding} \}$

The closure of proj_ID includes all attributes so **proj_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Student Interest Group:

Attributes: SIG_ID, SIG_name, SIG_DOE, SIG_field

Minimal FD set: $\text{SIG_ID} \rightarrow (\text{SIG_name}, \text{SIG_DOE}, \text{SIG_field})$

$\{\text{SIG_ID}\}^+ = \{ \text{SIG_ID}, \text{SIG_name}, \text{SIG_DOE}, \text{SIG_field} \}$

The closure of SIG_ID includes all attributes so **SIG_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Session:

Attributes: ses_ID, ses_topic, ses_etime, ses_stime, ses_desc, SIG_ID

Minimal FD set: $\text{ses_ID} \rightarrow (\text{ses_topic}, \text{ses_etime}, \text{ses_stime}, \text{ses_desc}, \text{SIG_ID})$

$\{\text{ses_ID}\}^+ = \{ \text{ses_ID}, \text{ses_topic}, \text{ses_etime}, \text{ses_stime}, \text{ses_desc}, \text{SIG_ID} \}$

The closure of ses_ID includes all attributes so **ses_ID** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Conference Participation:

Attributes: IEEEENumber, con_ID, travel_grant

Minimal FD set: IEEEENumber, con_ID \rightarrow (travel_grant)

$\{\text{IEEEENumber, con_ID}\}^+ = \{\text{IEEEENumber, con_ID, travel_grant}\}$

The closure of $\{\text{IEEEENumber, con_ID}\}$ includes all attributes so **$\{\text{IEEEENumber, con_ID}\}$** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

Student Branch Designation:

Attributes: SB_ID, SB_position, SB_year, IEEEENumber

Minimal FD set: SB_ID, SB_position, SB_year \rightarrow (IEEEENumber)

$\{\text{SB_ID, SB_position, SB_year}\}^+ = \{\text{SB_ID, SB_position, SB_year, IEEEENumber}\}$

The closure of $\{\text{SB_ID, SB_position, SB_year}\}$ includes all attributes so **$\{\text{SB_ID, SB_position, SB_year}\}$** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

PaperPresentation:

Attributes: pap_ID, con_ID, IEEEENumber

Minimal FD set: pap_ID, con_ID \rightarrow (IEEEENumber)

$\{\text{pap_ID, con_ID}\}^+ = \{\text{pap_ID, con_ID, IEEEENumber}\}$

The closure of $\{\text{pap_ID, con_ID}\}$ includes all attributes so **$\{\text{pap_ID, con_ID}\}$** is key. The functional dependency set has the key on the left and rest of the attributes on right. So this relation is in BCNF.

PaperWritten:

Attributes: IEEEENumber, pap_ID

Minimal FD set: No functional dependencies.

So this relation is in BCNF.

ProjectWork:

Attributes: IEEEENumber, proj_ID

Minimal FD set: No functional dependencies.

So this relation is in BCNF.

SIG Member:

Attributes: IEEEENumber, SIG_ID

Minimal FD set: No functional dependencies.

So this relation is in BCNF.

Jury:

Attributes: IEEEENumber, con_ID

Minimal FD set: No functional dependencies.

So this relation is in BCNF.