Solution 1

(For the following section, there may be multiple solutions which slightly vary depending on your chosen method for mapping. If you are unsure about the correctness of your answer, please check with a tutor.)

Solution 1a

PROJECT [Name, Number, Location, Controlling_department]

(The underline goes under either Name or Number as they are both unique.)

Solution 1b

CAR [State, Number, Vehicle_id, Year, Model, Make]

CAR_COLOUR [Vehicle_id, Color]

Foreign Keys:

CAR_COLOUR.Vehicle_Id → CAR.Vehicle_Id

(The underline goes under either Vehicle_id or State and Number as both sets are unique. Also, the multi-valued attribute requires a new table.)

Solution 1c

GRADE [Numeric_Grade]

COURSE [Cnum, CName, Description]

STUDENT [SSN, Fname, Lname]

REPORT [Numeric_Grade, Cnum, SSN]

Foreign Keys:

REPORT.Numeric_Grade → GRADE. Numeric_Grade

REPORT.CNum → COURSE.CNum

REPORT.SSN → STUDENT.SSN

Solution 1d

PART [Part_no, Description]

MANUFACTURED_PART [Part_no, Drawing_no, Batch_no, Manufacture_date]

PURCHASED_PART [Part_no, Supplier_name, List_price]

Foreign Keys:

MANUFACTURED_PART.Part_no → PART.Part_no

PURCHASED_PART.Part_no → PART.Part_no

Solution 2

Step 1: Entity

BANK [Code, Name, Addr]

CUSTOMER [Ssn, Name, Addr]

ACCOUNT [Acct_No, Balance, Type]

LOAN [Loan_No, Amount, Type]

Step 2: Weak-Entity

BANK [Code, Name, Addr]

CUSTOMER [Ssn, Name, Addr]

ACCOUNT [Acct_No, Balance, Type]

LOAN [Loan_No, Amount, Type]

BANK_BRANCH [Branch_No, Code, Addr]

Step 4: 1-N

BANK [Code, Name, Addr]

CUSTOMER [Ssn, Name, Addr]

ACCOUNT [Acct_No, Balance, Type, Branch_No, Code]

LOAN [Loan_No, Amount, Type, Branch_No, Code]

BANK_BRANCH [Branch_No, Code, Addr]

Step 5: M-N

BANK [Code, Name, Addr]

CUSTOMER [Ssn, Name, Addr]

ACCOUNT [Acct_No, Balance, Type, Branch_No, Code]

LOAN [Loan_No, Amount, Type, Branch_No, Code]

BANK_BRANCH [Branch_No, Code, Addr]

A_C [Acct_No, Ssn]

L_C [Loan_No, Ssn]

Step 7: Multivalued Attribute

BANK [Code, Name, Addr]

CUSTOMER [Ssn, Name, Addr]

ACCOUNT [Acct_No, Balance, Type, Branch_No, Code]

LOAN [Loan_No, Amount, Type, Branch_No, Code]

BANK_BRANCH [Branch_No, Code, Addr]

A_C [Acct_No, Ssn]

L_C [Loan_No, Ssn]

CUST_PHONE [Ssn, Phone]

Final Foreign Keys:

BANK_BRANCH.Code → BANK.Code

ACCOUNT.Branch_No, Code → BANK_BRANCH.Branch_No, Code

LOAN.Branch_No, Code → BANK_BRANCH.Branch_No, Code

A_C.Acct_No → ACCOUNT.Acct_No

L_C.Loan_No → LOAN.Loan_No

A_C.Ssn → CUSTOMER.Ssn

L_C.Ssn → CUSTOMER.Ssn

CUST_PHONE.Ssn → CUSTOMER.Ssn

Solution 3

REGION

RegionID	RegionName	Population	RegionType	EvacPlan

SENSORNODES

NodeID	Latitude	Longitude	last-check-date	RegionID

RegionID references REGION(RegionID)

NODEREADING

NodeID	ReadingDate	Temperature	Humidity

NodeID references SENSORNODES(NodeID)

REGIONINCIDENTHISTORY

IncidentID	RegionID	IncidentStartDate	Duration	Level	ReportLink

RegionID references REGION(RegionID)

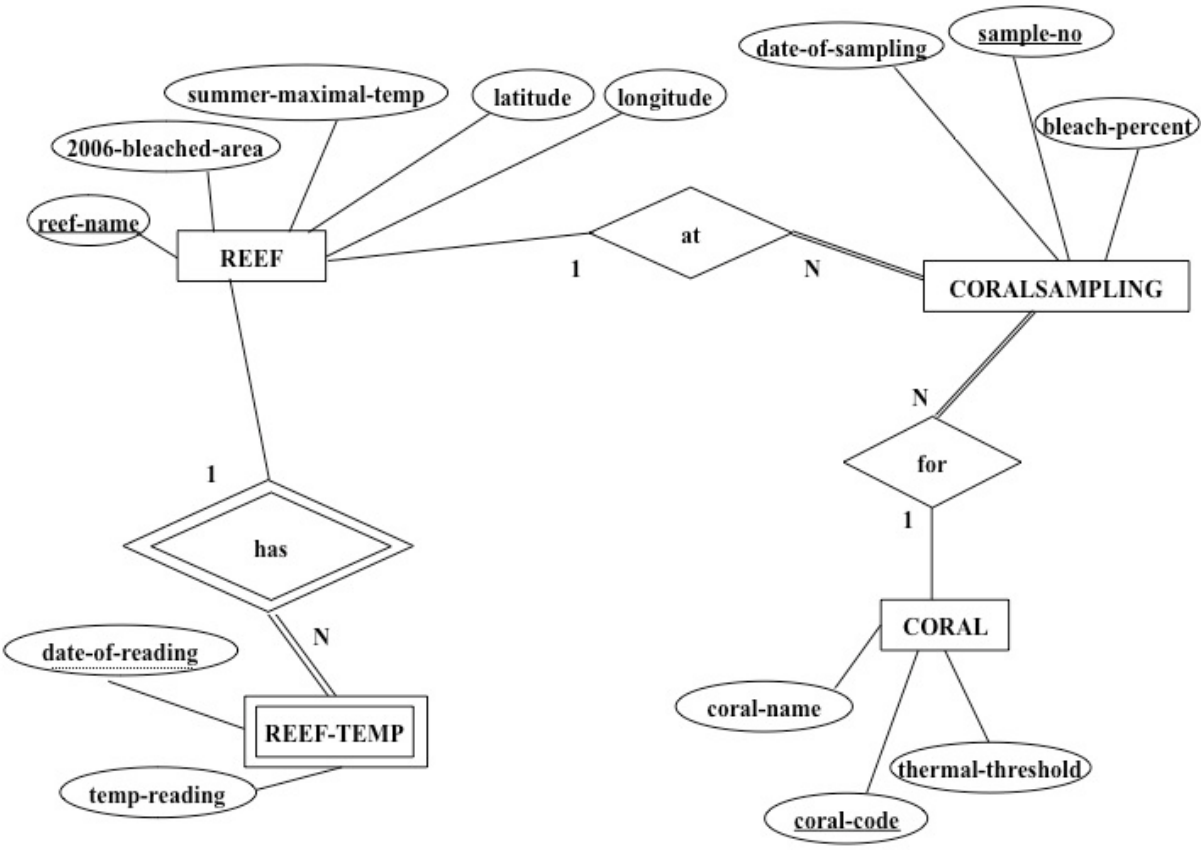
BUSHFIREPATH

IncidentID	StartNodeID	EndNodeID	TimeTaken

IncidentID references REGIONINCIDENTHISTORY(IncidentID)
StartNodeID references SENSORNODES(NodeID)
EndNodeID references SENSORNODES(NodeID)

Solution 4

It may not be possible to conclusively derive cardinalities/participation. For the most part, rely on logic and what would be reasonable in the real world.



Solution 5

It may not be possible to conclusively derive cardinalities/participation. For the most part, rely on logic and what would be reasonable in the real world.