AY2025/26 SEMESTER 2

SC2207 Introduction to Databases

Lab Group: SCMB

Group: 2

Number	Group members
01	Loh Zhi Ye Bryan
02	Tan Xie En Barnabas
03	Goh Qing Wen
04	Dashini Naidu

INDIVIDUAL CONTRIBUTION FORM

Full Name	Individual Contribution to Lab 1 Submission	Percentage of Contribution	Signature
Loh Zhi Ye Bryan	Created relation schemas, identified primary keys and functional dependencies, did 3NF normalization	25%	
Tan Xie En Barnabas	Created relation schemas, identified primary keys and functional dependencies, did 3NF normalization	25%	
Goh Qing Wen	Created relation schemas, identified primary keys and functional dependencies, did 3NF normalization	25%	
Dashini Naidu	Created relation schemas, identified primary keys and functional dependencies, did 3NF normalization	25%	

USE OF AI TOOL(S) IN LAB WORK

Each team member should indicate either A or B:

A. I affirm that my contribution(s) to the lab work is my own, produced without help from any AI tool(s).

B. I affirm that my contribution(s) to the lab work has been produced with the use of AI tool(s).

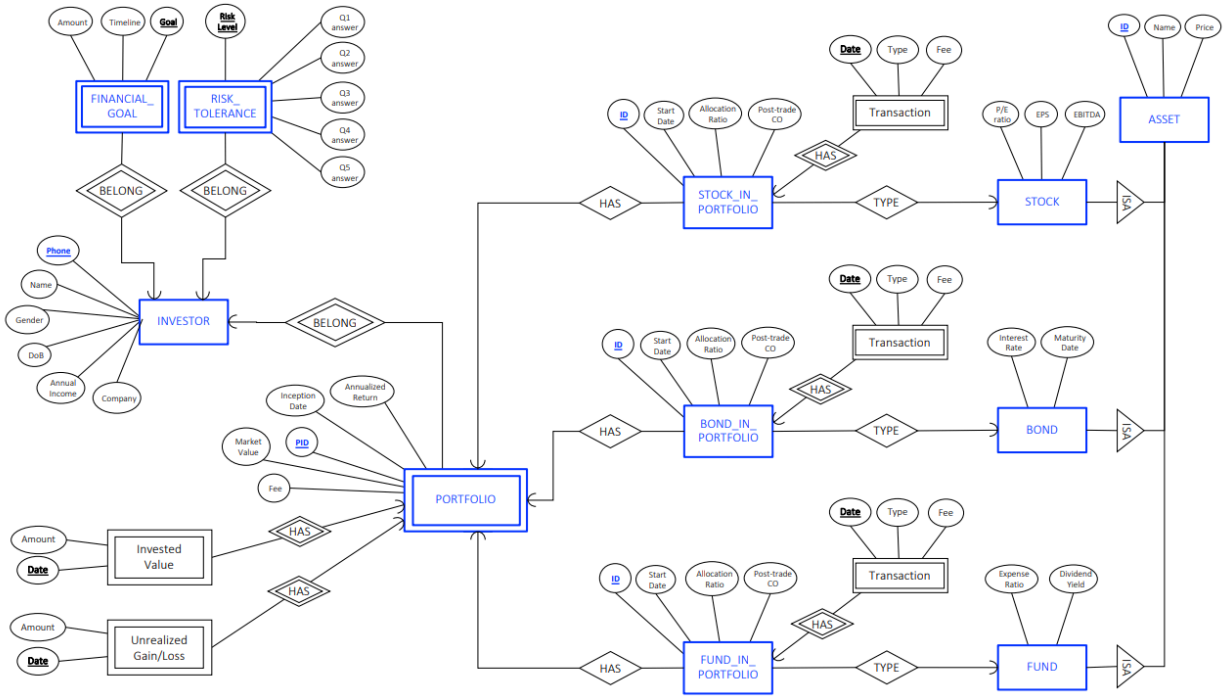
Team member (full name)	Signature	Date	A or B
Loh Zhi Ye Bryan		25/2/2025	A
Tan Xie En Barnabas		25/2/2025	A
Goh Qing Wen		25/2/2025	A
Dashini Naidu		25/2/2025	A

By signing this form, you declare that the above affirmation made is true and that you have read and understood NTU's policy on the use of AI tools.

If any team member answered B, the team member(s) must indicate and replicate the table below for every instance that AI tool(s) is used:

Name of AI tool	< For example, ChatGPT >
Input prompt	< Insert the question that you asked ChatGPT >
Date generated	
Output generated	< Insert the response verbatim from ChatGPT >
Output screenshots	
Impact on submission	< Briefly explain which part of your submitted work was ChatGPT's response applied >

We used the Lab 1 ER diagram suggestion:



FINANCIAL_GOAL(A: Goal,B: Phone, C: Amount, D: Timeline)

Key: AB

FD(s): AB -> CD

BCNF

RISK_TOLERANCE(A: Risk Level, B: Phone, C: Q1 answer, D: Q2 answer, E: Q3 answer, F: Q4 answer, G: Q5 answer)

Key: AB

FD(s):

AB -> CDEFG

CDEFG -> A

3NF

INVESTOR(A: Phone, B: Name, C: Gender, D: DoB, E: Annual Income, F: Company)

Key: A

FD(s):

A -> BCDEF

BCNF

PORTFOLIO(A: PID, B: Phone, C: Fee, D: Market Value, E: Inception Date, F: Annualized Return)

Key: AB

FD(s):

AB -> CDEF

DE -> F

DF->C

Not 3NF

3NF Normalization:

1.To find minimal basis,

AB->C, AB->D, AB->E, AB->F, DE->F, DF->C

Remove AB->C, {AB}+ = {ABCDEF}. AB->C redundant.

Result: {AB->D, AB->E, AB->F, DE->F, DF->C}

Remove AB->D, {AB}+ = {ABEF}. AB->D not redundant.

Remove AB->E, {AB}+ = {ABCDF}. AB->E not redundant.

Remove AB->F, {AB}+ = {ABDEF}. AB->F redundant.

Result: {AB->D, AB->E, DE->F, DF->C}

Remove DE->F, {DE}+ = {DE}. DE->F not redundant.

Remove DF->C, {DF}+ = {DF}, DF->C not redundant.

Result: {AB->D, AB->E, DE->F, DF->C}

For AB->D, AB->E,

Remove A, {B}+ = {B}. A not redundant.

Remove B, {A}+ ={A}. B not redundant.

For DE->F,

Remove D, {E}+ = {E}. D not redundant.

Remove E, {D}+ = {D}. E not redundant.

For DF->C,

Remove D, {D}+ = {D}. D not redundant.

Remove F, {F}+ = {F}. F not redundant.

Minimal Basis: {AB->D, AB->E, DE->F, DF->C}

2. Combine FD’s with same LHS

Result: {AB->DE, DE->F, DF->C}

3. Create table for each FD

R1(ABDE), **R2**(DEF), **R3**(CDF)

3NF

Invested Value(A: Date, B: PID, C: Phone, D: Amount)

Key: ABC

FD(s):

ABC->D

BCNF

Unrealized Gain/Loss(A: Date, B: PID, C: Phone, D: Amount)

Key: ABC

FD(s):

ABC->D

BCNF

STOCK_IN_PORTFOLIO(A: ID, B: Start Date, C: Allocation Ratio, D: Post-trade CO, E: PID, F: Phone, G: STOCK_ID)

Key: A

FD(s):

A->BCDEFG

EF->C

Not 3NF

3NF Normalization:

1.To find minimal basis,

A->B, A->C, A->D, A->E, A->F, A->G, EF->C

Remove A->B, {A}+ = {ACDEFG}. A->B not redundant.

Remove A->C, {A}+ = {ABCDEFG}. A->C redundant.

Result: {A->B, A->D, A->E, A->F, A->G, EF->C}

Remove A->D, {A}+ = {ABCEFG}. A->D not redundant.

Remove A->E, {A}+ {ABDFG}. A-> E not redundant.

Remove A->F, {A]+ = {ABDEG}. A->F not redundant.

Remove A->G, {A}+ = {ABCDEF}. A-> G not redundant.

Remove EF->C, {EF}+ = {EF}. EF->C not redundant.

Result: {A->B, A->D, A->E, A->F, A->G, EF->C}

For EF->C,

Remove E, {F}+ = {F}. E not redundant.

Remove F, {E}+ = {E}. F not redundant.

Result: {A->B, A->D, A->E, A->F, A->G, EF->C}

2.Combine FDs with same LHS,

{A->BDEFG, EF->C}

3.Create table for each FD

R1(ABDEFG), **R2**(CEF)

3NF

BOND_IN_PORTFOLIO(A: ID, B: Start Date, C: Allocation Ratio, D: Post-trade CO, E: PID, F: Phone, G: BOND_ID)

Key: A

FD(s):

A->BCDEFG

EF->C

3NF Normalization: see STOCK_IN_PORTFOLIO for steps

After 3NF Normalization, R1(ABDEFG), R2(CEF)

FUND_IN_PORTFOLIO(A: ID, B: Start Date, C: Allocation Ratio, D: Post-trade CO, E: PID, F: Phone, G: FUND_ID)

Key: A

FD(s):

A->BCDEFG

EF->C

3NF Normalization: see STOCK_IN_PORTFOLIO for steps

After 3NF Normalization, R1(ABDEFG), R2(CEF)

STOCK_TRANSACTION(A: Date, B: STOCK_IN_PORTFOLIO ID, C: Type, D: Fee)

Key: AB

FD(s):

AB->CD

BCNF

BOND_TRANSACTION(A: Date, B: BOND_IN_PORTFOLIO ID, C: Type, D: Fee)

Key: AB

FD(s):

AB->CD

BCNF

FUND_TRANSACTION(A: Date, B: FUND_IN_PORTFOLIO ID, C: Type, D: Fee)

Key: AB

FD(s):

AB->CD

ASSET(A: ID, B: Name, C: Price)

Key: A

FD(s):

A->BC

BCNF

STOCK(A: ID, B: P/E ratio, C: EPS, D: EBITDA)

Key: A

FD(s):

A->BCD

BCNF

BOND(A: ID, B: Interest Rate, C: Maturity Date)

Key: A

FD(s):

A->BC

BCNF

FUND(A: ID, B: Expense Ratio, C: Dividend Yield)

Key: A

FD(s):

A->BC

BCNF