HW1 part 1

10 1. Fixing an E/R diagram

15 2. Submit min-size E/R diagram

5 3. ~~[illegible]~~

4. For 2.2, place info on objects into appr places in diagram

HW2 part 1

0 1. NULLs approach to hierarchy

3 2. o/o approach to hierarchy

1 3. translate (weak)

0 4. E/R (hierarchies) + weak

7 5. All 3 approaches to hier

HW3

1. $A(MNOPQRST)$ – which FDs are implied?

2. Keys & superkeys of $R(MNOPST)$

3. Is in BCNF?

4. Is in 3NF?

5. Correct BCNF decomp?

6. theta-join on given inputs

7. basis

HW4

1. bag union of bag π and σ, ✓
2. bag π, bag difference, ✓
3. student/university/tutor schema – correctness of rel alg vs test
4. SQL – compute answer
5. generalized π
6. left natural outerjoin
7. bag π, bag intersection

HW3 #7

R(ABC)

B → C

AB → C ⇐ looks superfluous

On a given relation, a basis of a set of its FDs is a
- minimal
- nonredundant

set of its FDs that implies all the FDs of that relation

(set of all FDs that hold)

$\downarrow(ABC)$

$A \to B$

$B \to C$ $\Rightarrow$ $A \to C$

$\{A \to B, B \to C, \underline{A \to C}\}$ – not a basis

$\{A \to B\}$ – not a basis

$\{A \to B, B \to C\}$ – is a basis

$R(W\ M\ X\ Y\ Z)$

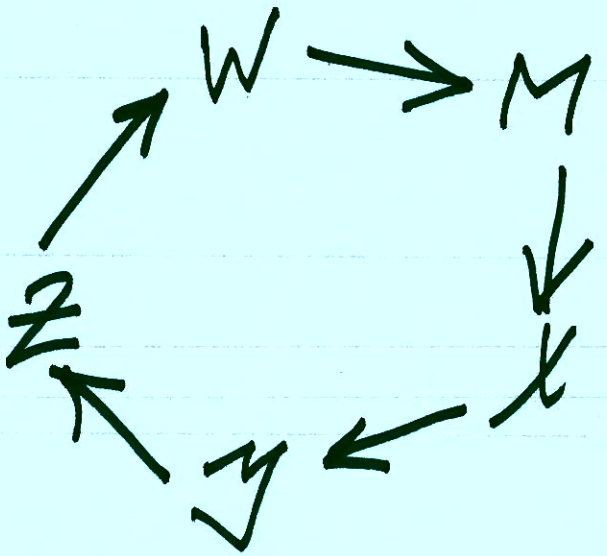
$W \to M$

$M \to X$

$X \to Y$

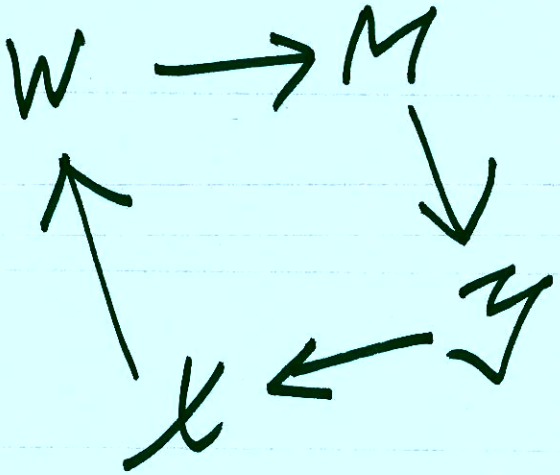
$Y \to Z$

$Z \to W$



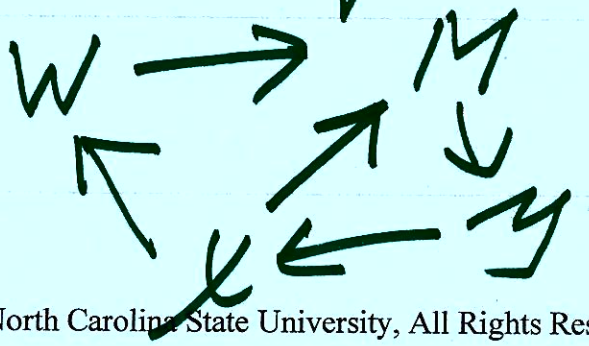
Find bases of a projection of R on attributes $WMXY$

Incorr # 1:



– is a basis, hence the stmt in incorr #1 is incorrect

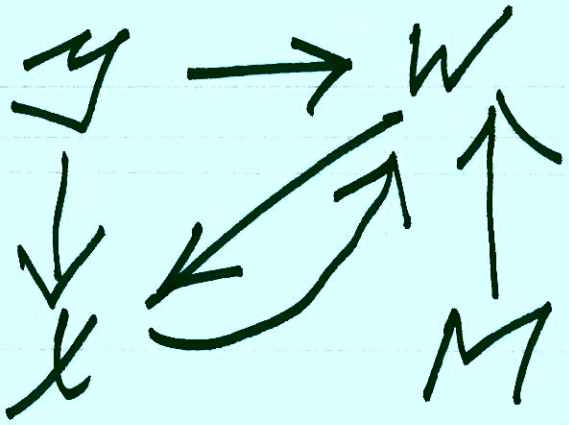
If you were given



– not a basis (has extra

Correct # 4

Not a basis:



M does not follow from anything

⇒ not a basis

Syntax discussion without demonstrating candidate bases:

$A \to BC$ can be converted into

$A \to B$

$A \to C$

HW4 #3

(please give me specific official answers)

HW3 #2

$R(MNOPST)$

keys & superkeys

$NS \rightarrow T$

$MNO \rightarrow P$

$NO \rightarrow T$

$MPST \rightarrow N$

Corr #3: Superkeys that are not keys:

$MNOPST$ – all the attributes

$MNOP^{+} = MNOPST$

$MNOST$

MNOP$\rightarrow$ - why not a key?

Drop 1 attr at a time:

not superkey

NOP$\rightarrow$+ = NOP$\rightarrow$T - cannot get M

MOP$\rightarrow$+ = - cannot get N

MNP$\rightarrow$+ = - cannot get O

MNOP+ =

MNO$\rightarrow$+ =

$\Rightarrow$ if each of these is not a superkey, and MNOP$\rightarrow$ is a superkey $\Rightarrow$ MNOP$\rightarrow$ is a key

MNOS+ = MNOSTP

↓

proper subset of MNOPS is a superkey

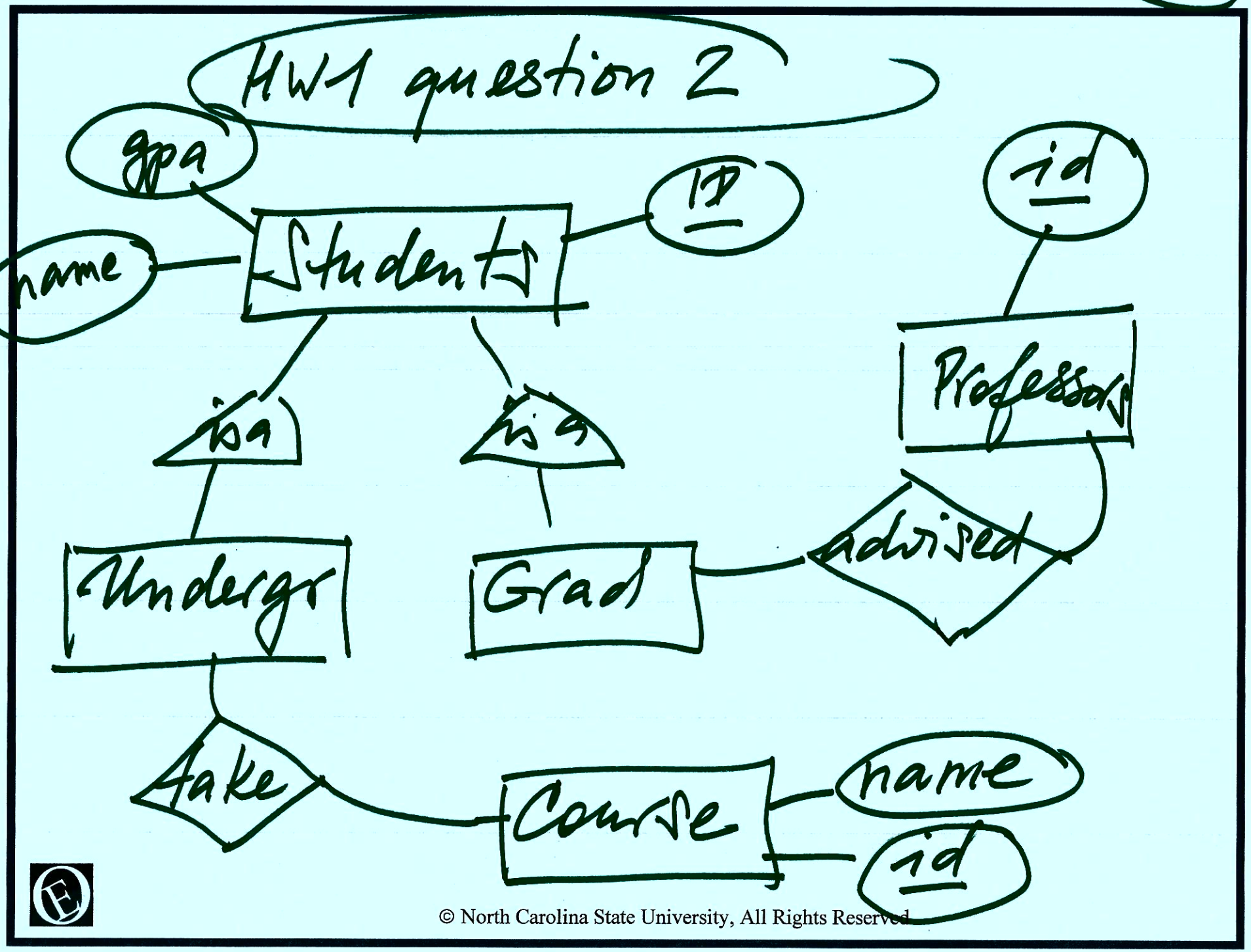
⇒ MNOPS is not a key

Incorr #1:

All these are keys: MNOPST — not a key

MNOPS ✓

MNOST



Translating into relation schemas:

(1) the NULLs approach

Student(ID, gpa, name)

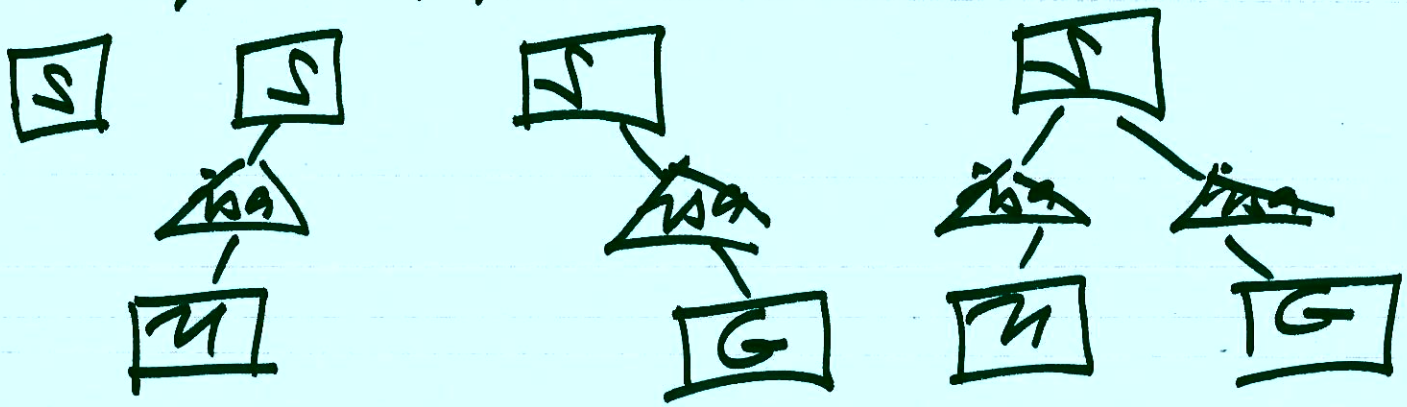
Course(id, name)

Professor(id)

Advised(sid, pid)

Take(sid, cid)

(2) The o/o approach:



S(ID, gpa, name)
SM(ID, gpa, name)
SG(ID, gpa, name)
SUG(ID, gpa, name)
Course(cid, name)
Professors(id)

Advised(sid, pid)
Take(sid, cid)

(3) The E/R approach:

Course(<u>id</u>, name)

Professors(<u>id</u>)

Advised(<u>fid</u>, <u>Pid</u>)

Take(<u>fid</u>, <u>Cid</u>)

Students(<u>id</u>, gpa, name)

UStudents(<u>id</u>)

GStudents(<u>id</u>)

HW3 #5

Incorr #1

R(ABCD)

- $A \to B$
- $A \to C$
- ✓ $D \to A$

$A+ = ABC$

$D+ = DABC$

R1(ABC)

$A+ = ABC$

$B+ = B$

$C+ = C$

$AB+ = ABC$

$AC+ = ABC$

$BC+ = BC$

R2(AD)

$A \to B$

$A \to C$

$AB \to C$

$AC \to B$