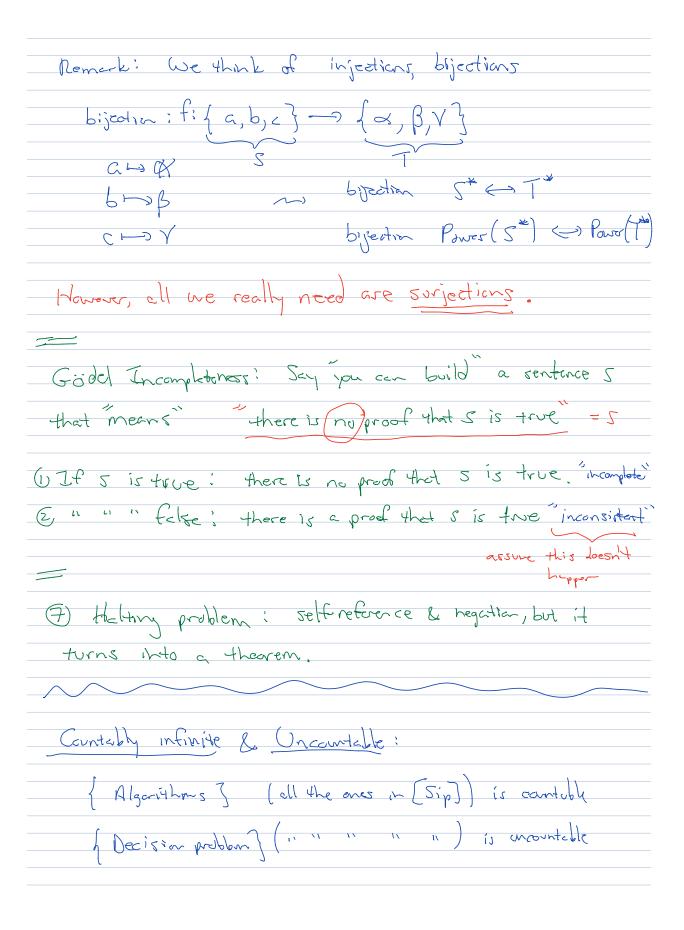
CPSC 421/501: Start Ch 1 (regular languages) of (Sip) on Wednesday
-2 or 3 more paradoxes/theorems
- Countably infinite and uncountable sets
There is no surjection IN -> Power(IN)
(1,2,3) -> Power ((1,2,3))
$A^* \longrightarrow Pawe(A^*)$
If there is a swjedian 5-T than " 5/3/T/
If there is an injection STT then "SIETT"
(5) Contain themselves." Serious problem: a lot of people worked to
contain themselves. Socials problem; a lot of people worked to
fry this, Problem? Does 5 contain itself???
() If SES then S is a set that do not contan itself,
CIII S&S then SES.
Can a sea really ever contain itself, can {1,2,3} f {1,2,3} ?)
Usual idea: probably all sets, S, don't contain themselves
Russell's Paradox: "Let S be the set of all sets that do not } Should be contain thenselves." Sarious problem; a lot off people worked to } all sets. Heeded to be
Remedy: "All sets is a class (something that he bosser than a set) Solved



Tools:
() If Sis cantable, and there is a bijection S-T,
then T is countable.
Proof: S is aboutable, honce there is a sujection 17 & S.
Then IN -> S -> T gives sujection N -> T.
(1) What if we have a sujection 5-3 T and S
is countable? Then worth swes IN a swjecting T
(N en) 2 sur) I gives (N = rivication]
Convenient to notice: the compositions of 2 sujections
Tra surjection. (Worked out)
Homework !: The composition of 2 injections is an injection
If A is an alphabet, then A is countably infinite.
Proof 1: E.g. A= (a,b,c),
$A^{t} = \{ E, q_{j}b_{j}c \}$ $C_{j}c_{j}c_{j}c_{j}c_{j}c_{j}c_{j}c_{j}c$
Proof 2's Associate to aabacaccb bus
9112111332
2 3 57 11 13 17 19 23

*
Gues {1,2,3} = 1 Shald exist surjection
injective,
$\mathbb{N} \to \{1,2,3\}^*$
Since A & W then
Power (A) Dower (IN) - uncomtable
Power (A) () Power (IN) (uncomfable
POWOR (IN) = PRIMER, EVEN, ODD, DIVISIBLE_BY_2
The part of the pa
, 1, 1, 3, - \
{1,2,3} → Power ({1,2,3)} ! (∈f(1) , 2 €f(2), 3 € f(3)
d (1)) - Lour ((1) (2)) , ((4(1)) 5 (4(2)) 2 (4(2))