

Test 1

Bradley  
Harper

$$\begin{aligned}
 1 \text{ Basis: } n=4 & \quad (100^{n+1} - 1)/99 \\
 & \quad (100^{4+1} - 1)/99 \\
 & \quad (100^5 - 1)/99 \\
 & \quad (10000000000 - 1)/99 \\
 1 + 100 + \dots + 100^4 & = 101010101 \\
 101010101 & = 101010101
 \end{aligned}$$

Induction Step  $n=k$

$$\text{Assume: } 1 + 100 + \dots + 100^k = (100^{k+1} - 1)/99$$

$$n=k+1$$

$$1 + 100 + \dots + 100^k + 100^{k+1} = (100^{(k+1)+1} - 1)/99$$

$$(100^{k+1} - 1)/99 + 100^{k+1} = (100^{(k+1)+1} - 1)/99$$

$$\frac{100^{k+1} - 1}{99} + \frac{99(100^{k+1})}{99} = \frac{100^{(k+1)+1} - 1}{99}$$

$$\frac{100^{k+1} - 1 + 99(100^{k+1})}{99} = \frac{100^{k+1+1} - 1}{99}$$

$$\frac{100^{k+1}(1 + 99) - 1}{99}$$

$$= \frac{100^{k+1}(100) - 1}{99}$$

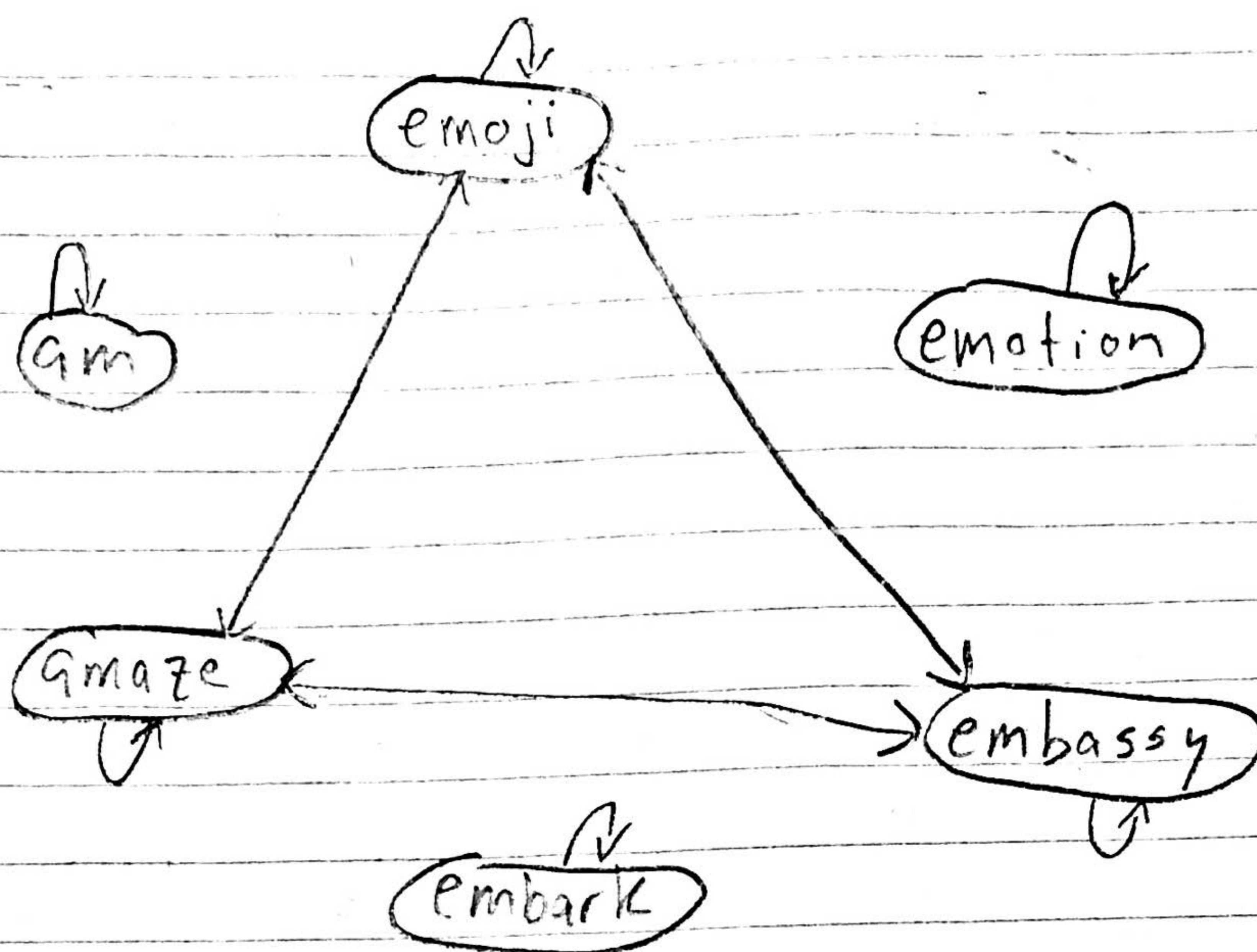
$$= \frac{100(100)^{k+1} - 1}{99}$$

$$\checkmark = \frac{100^{k+1+1} - 1}{99} = \frac{100^{k+1+1} - 1}{99} \checkmark$$

2. 100



3



Reflexive ✓

Symmetry ✓

Transitive ✓

✓ is an equivalence relation.  
4 equivalence classes.

4 a. {f, u, n, y}

b. y

c. n

d. f can only be preceded by f

e. if  $yz$ , then  $\underbrace{nyz}_{nz}$ . If  $nz$ , then  $\underbrace{nnz}_{nz}$ . If  $nz$ ,  $\underbrace{unz}_{nz}$ . If  $yz$ ,  $\underbrace{fuz}_{nz}$ .

FUNNY

5 Basis:  $(0, s(s(0))) \in \text{Threetimes plus two}$

If  $(x, y) \in \text{Threetimes plus two}$

then  $(s(s(x)), s(s(s(0)))) \in \text{Threetimes plus two}$

Testing:  $\text{Threetimes plus two} = \{(0, s(s(0))), (s(0), s(s(s(0))))\}$   
 $(s(s(0)), s(s(s(s(s(0))))))$

$$3(x+1) + 2 = 3x + 3 + 2$$

$$= 3(x+1) + 2$$



FFF, FFF, FFF,

FFF, FFF, FFF,

FFF, FFF, FFF, FFF, FFF, FFF,

6. ~~FFF is the concatenation of the set to itself.~~

+ means one or more copies

FFF, FFF, FFF, FFF, FFF, FFF,

F is a set, looking for one or more copies (\*) of EE with F being concatenated to D.

- 7 a. True  
b. False

- 8 a. True  
b. False

c. false  $|GH| = 9$

- 9  $GF = FG$ ,  $G \times F = F \times G$ ,  $|GF| \neq |F \times G|$   
10 The empty set & the set containing the empty set

11 Basis:  $(\lambda) \in L$ ,  $h \in L$ ,  $hf \in L$

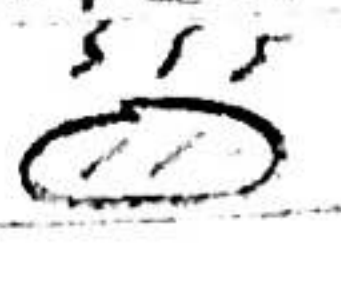
Rec Step: If  $x \in L$  and  $x \in \{\lambda\}^*$  then  $xhh \in L$

If  $x \in L$  and  $x \in \{h\}^*$  then  $xhh \in L$

If  $x \in L$  and  $x \in \{hf\}^*$  then  $xhf \in L$



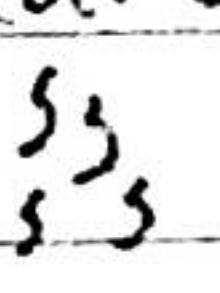
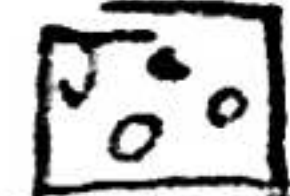
## Bread

1. Dark brown circle ○ = Whole wheat, it's brown
2. Oval with lines coming off , rye smells
3. ⊕ white circle, Sourdough usually looks like that

## Protein

1. ☺ yellow bird, issa chicken
2. ○ green fatty shape, Avocado

## Cheese

1. □ white square, feta is usually a white cube
2. mozzarella , s shaped lines, shredded mozzarella
3. [H] → H for Havarti
4.  holes for cartoon swiss