1)

mapper (record ):

for (customer’s unique identifier, postcode, product ) in record:

emit(product, 1)

reducer(product, values):

sum = 0

for each value in values:

sum += value

emit(produt ,sum)

2)

mapper (record ):

for (customer’s unique identifier, postcode, product ) in record:

emit(postcode, customer’s unique identifier )

reducer(postcode, values):

customers = []

for each value in values:

customers.append(value)

emit(postcode , customers)

3.