On the Correspondence of Data Structures

On Correspondence

- Algorithm **input** and **output** can frequently be described with **regular expressions** – consisting of sequence, choice and loops over data elements

- Data structures **correspond** when the same loop structure can be used to describe both structures
  - **including loop conditions**

- Data structures do not correspond when
  - » **Their loop structures do not nest within each other**
  - » **Or their loop conditions are different**

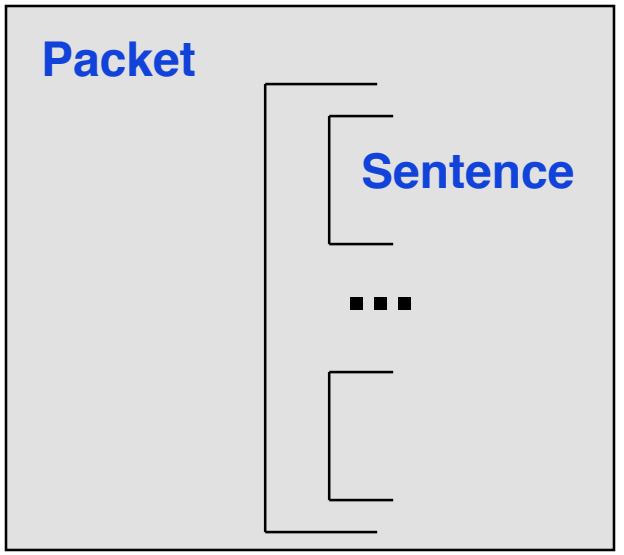
Packet & Sentence Example

- Consider a sequence of email packets sent over the network
- Information within the packets is a sequence of sentences
- A loop over packets does not correspond with a loop over sentences and vice versa

Packet & Sentence Example – 2

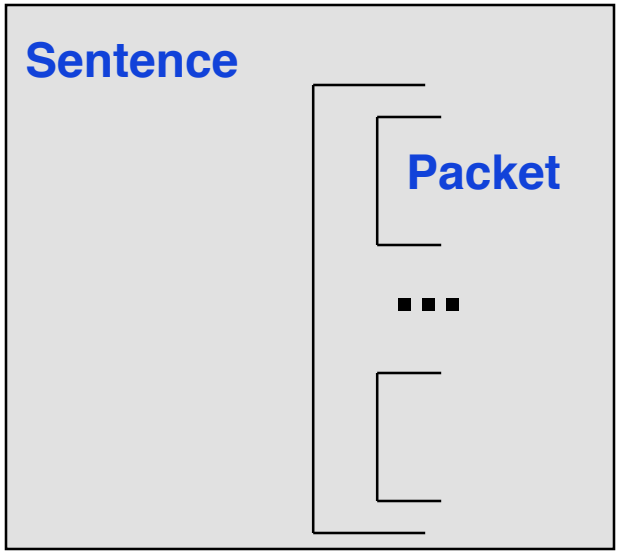
- Sentences span packet boundaries
  - » **Do not have an integral number of sentences within every packet**

does not occur →



  - » **Do not have have an integral number of packets within every sentence**

does not occur →



Packet & Sentence Example – 3

- Using the **Direct Mapping Rule** you should be able to point to the program text, draw a box and say
  - » **One packet corresponds to this box**
    - > **No more and no less**
  - » **One sentence corresponds to this box**
    - > **No more and no less**

- In modelling both sentences and packets it is necessary to have explicit loops for each or else you violate the Direct Mapping Rule