

CSI 402 – Program I

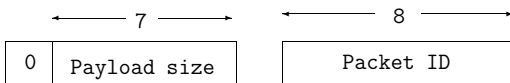
Administrative Information:

- **Deadline:** 11 PM, Wednesday, Feb. 15, 2006.
- Two parts, but just one makefile.
- Two or more C source files for each part.
- README file (by 10 PM, Feb. 6, 2006):
~csi402/public/prog1/prog1.README

Part (a): (Weightage: 30%)

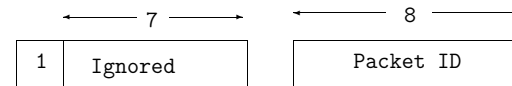
Goal: Program to process data collected by a network simulation program.

Data Packet Header:



Note: For a data packet, the header is followed by a number of bytes equal to the payload size.

Control Packet Header:



Note: A control packet consists of just the 2-byte header; there is *no* payload.

Command line details:

% p1a *flag infile*

- The *flag* parameter may be "-c", "-d" or "-cd".
 - (a) "-c": Program must output information about control packets. (See handout for details.)
 - (b) "-d": Program must output information about data packets.
 - (c) "-cd": Program must output information about both control and data packets.
- The *infile* parameter represents the name of the binary file containing the packet data.

Notes:

- Don't worry about (control/data) packets whose ID is larger than the largest (control/data) packet ID found in the input file.
- If the largest (control or data) packet ID is 8 and packets with IDs 0, 1, 4, 5, 6 and 7 are missing, then the list of missing IDs must be output in the following manner:

Missing packet IDs: 0, 1, 4-7

Errors to be detected: See handout.

Part (b): (Weightage: 70%)

Relational Databases:

- Data stored as relations (tables).
- May have many relations.

Example: Relation Roster.

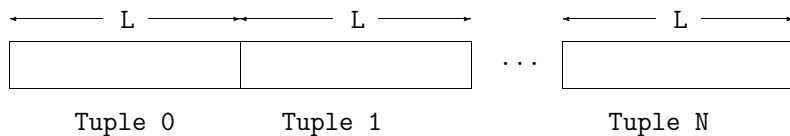
Name	Major	Totcr	Majcr
----	-----	-----	-----
Smith, Bob	PSY	57	30
Woods, Jane	CSI	64	39
Baker, Dan	PSY	57	48

Notes:

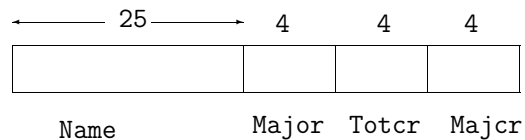
- (a) Name, Major, Totcr, Majcr: Attributes.
- (b) Each row of data: Tuple.
- (c) The schema for each relation gives:
 - (i) Name of each attribute.
 - (ii) Type of each attribute ('I' or 'S').
 - (iii) Length (in bytes) for each attribute.
- (d) Length of each tuple (in bytes) = Sum of the lengths of the attributes.

How tuples are stored:

- In a binary file.
- Each tuple is of the same length (which can be determined from the schema information).



Example – Tuple for Roster Relation:



Length of each tuple = 37 bytes.

Notes:

- Length of each integer attribute = 4 bytes.
- Length of each string attribute includes the byte for '`\0`'.

Command line details:

```
% p1b configfile
```

Parameter *configfile*:

- Specifies the name of a text file (called the **configuration** file).
- First line: No. of relations in the database.
- Subsequent lines: Information about the relations.
(See the example on page 6 of the handout.)

Commands to be processed:

- listrel
- schema
- query
- quit

Note: A sample query session will be discussed in class.

Errors to be detected: See handout.