(Background for Assignment 2)

The following question and answer sequence goes on between Swifp and Hobs to help Swifp specify requirements for CorTrap:

Swifp: What are the units and valid ranges for all the input data for the calculation engine?

Hobs: They're in the theory paper we published back on Procyon IV.

Swifp: How accurate does the input data have to be?

Hobs: As accurate as you can get it.

Swifp: What does the 1307 cut off mean? How quickly should the researchers return once they accumulate 1307 BTUs?

Hobs: Soon.

Swifp reads the theory paper, persists with her questions, and accumulates the following facts:

Input data for the calculation engine:

Data item	Units (all in Procyon IV units)	Valid Range of values	Precision expected
Time	PODs	0 to infinity	Integral number
Atmospheric pressure	PFs	80 to 500	Real number to 2 decimal places
Atmospheric temperature	TFs	-72 to +100	Real number to 2 decimal places
O2 content	Percent	0 to 100	Real number to 2 decimal places
H2O content	Percent	0 to 100	Real number to 2 decimal places
O3 content	Percent	0 to 100	Real number to 2 decimal places
Body mass	MFs	260 to 150000	Integral number

Recall Parameter

The amount of damage to a Tofo individual is directly proportional to the corrosion expressed in BTUs. A Tofo individual can recover completely with rest and treatment if the damage is below a certain threshold. The threshold however is very difficult to

determine since it varies from one individual to another. The recall number recommended by Hobs (1307 BTUs) takes into account:

- the 10% error in the calculation engine
- the smallest (mass) individual on the ship

However, Swifp realizes that once researchers have been flagged to return to the ship, they can't be picked up until the next orbit. So to be safe, Swifp really needs to estimate the additional corrosion the researcher may get during the next orbit. She needs to accumulate and store the actual corrosion based on the measurements, but also estimate additional corrosion for the next orbit. It's this predicted corrosion that Swifp will use to check against the recall number.

So Swifp needs to calculate two numbers:

- the actual total corrosion accumulated per individual based on measurements
- a predicted total corrosion = actual total corrosion + estimated corrosion during next orbit

Operation of the Overall System

The on-planet researchers wear packs that measure several factors in the environment. The packs are sealed against tampering. If the seal is broken, an error signal of –1 is sent for all measurements.

The Tofo ship orbits Sol III in a regular period. An on-board machine picks up the signals from the researchers' packs, converts the signals to measurements, and spits out cards for each individual with

- the measurements
- the time the measurements were received
- the individual's name

The operator for CorTrap transfers the data from the cards (including the cards with error signals) to the input screen for CorTrap. Once all the data has been input, and the calculations complete, the operator prints out a list of all individuals who must be recalled on the next orbit, and gives the list to Commander Grog.