File Input/Output

Advanced Concepts

File Access – Basics

So far, we have used four commands to interact with files:

```
open : fileHandle, fileName, mode

put : fileHandle, data

get : fileHandle, variable
get : fileHandle, variable : *

close : fileHandle
```

Adding Data to a File

```
open : file, filename, put
```

When we open a file in “put” mode, Turing assumes a blank file. If the file is not empty, Turing will erase the contents.

To keep existing data, the “open” command must use an additional mode to modify the file (not erase it). This is the “mod” mode.

```
open : file, filename, put, mod
```

Adding Data to the End of a File

Although the file is no longer erased, any new data will be placed at the beginning of the file, and will overwrite the old data.

To add data to the end of the file, it is necessary to use the “seek” command to move to the end of the file. To use “seek” with the file, it must be enabled when opening the file.

```
open : file, filename, put, mod, seek
seek : file, *      % find the eof
```

Changing Data in the Middle of a File

Sometimes we want to keep the size of the file (or the number of data items), but want to change some of the data.

To modify data, we need to:
(a) find the data we want to change
(b) store the location of this data
(c) write the new data over the old

Finding Data to Change

The simplest way to search for your data is to open the file and read one piece of data at a time. The data can be simple (e.g., string, integer) or advanced (e.g., record).

Turing can store the current location in the file using the “tell” command, which will store the location in an integer variable.

Unfortunately, reading data moves the current location to the end of the data. Thus we need to store the location before we read the data.

Using the “tell” Command

```
var fileLocation : int

% to use tell, seek mode must be enabled
open file, fileName, get, seek
...
loop
   ...
   tell : file, fileLocation
   get : file, data
   ...
end loop
...
close : file
```

Changing the Data

To change the data, we seek the previously stored location, and then put the new data.

```
open : file, fileName, put, mod, seek
...
seek : file, fileLocation
put : file, data
...
close : file
```

Summary

open : file, fileName, get, put, mod, seek
-- mod allows file to be modified
-- seek enables the “seek” and “tell” commands

tell : file, location
- stores the current position within the file

seek : file, location
- go to the specified position within the file

seek : file, *
- go to the end of the file