Programming Languages: Homework 2

B. Mishra

October 9 1995

Note: *You are required to include a printout of a session showing a run of your program on some general testdata.*

Problem 1. [Problems 3.6 (pp. 112) in Sethi: Programming Languages—Concepts and Constructs.]

Problem 2. *An instant or interval of time expressed in hours, minutes and seconds can be represented by a record. For instance, one could define a type in Pascal as follows*

```
type HOUR     = 0..23;
type MINUTE   = 0..59;
type SECOND   = 0..59;
type TIME     = record hr: HOUR; min: MINUTE; sec: SECOND end;
```

Give the corresponding definition in ADA.
The following programs (with missing bodies) are supposed to add and subtract time intervals. Fill in the bodies:

```
function "+"(U,V: in TIME) return TIME is
   W: TIME;
begin
   --- MISSING BODY
return(W);
end "+";

function "-"(U,V: in TIME) return TIME is
   W: TIME;
begin
   --- MISSING BODY
return(W);
end "-";
```

Remark on the differences in style of programming as you go from Pascal to Ada.

For Extra Credit

How would you change it so that depending on a tag, the time could be in 12 Hrs (AM/PM) notation or in 24 Hrs notation as above?

Problem 3. *We have discussed before that, in PASCAL, it is impossible to write a single search procedure that can search for a given character within a given string. That is because strings of different lengths have different types in PASCAL. The idea of a "generic" procedure can be used to solve this problem in ADA. Write an ADA program to search for an item within an array; the procedure should be generic with respect to length of the array and type of the item.*

Write a short discussion of the advantages and disadvantages of this approach.

Hint: *Consider what happens if you use the generic procedure to search strings of many different lengths in the same program.*