CS23710 Worksheet Week Three 2000-01

David Price

February 16, 2001

1 Introduction

This practical is intended to provide practice with various control structures in 'C' together with the use of logical operators. You are also introduced to the concept of an array, in a simple form to hold sequences of characters.

NOTE: See section on character arrays at the end of this worksheet.

2 The Problem - Part One

A tri-athlon competition consists of three components, a cycling race, a swim and a final running race. The winner of the competition is the one with the shortest total time for the three races.

Write a program to calculate the total time for a single competitor.

Your input should consist of ten items. Firstly, the name of the competitor on a single line; this should not include any "white space", use underscore to provide gaps in the name. A second line of input should provide three integers representing the competitor's time for the cycle race in hours, minutes and seconds. A third line of input should provide the competitor's time for the swim in the same format. A fourth line of input should provide the competitor's time for the final running race in the same format.

The user should be provided with a prompt for each line of input expected.

An example of the input, together with the prompts is:

Competitor's name: Fred_Bloggs
Time for cycle race (hours minutes seconds): 1 35 47
Time for the swim (hours minutes seconds): 1 29 23
Time for the running race (hours minutes seconds): 1 05 14

The program output should be the competitors name and total time in the format shown below.

Competitor Fred_Bloggs has a total time of 3Hrs 5Mins 10Secs.

Your input and output should be in EXACTLY the format given above.

Don't forget your previous lectures (in other modules) on algorithm design. Before you start to tackle any computer program, write down a solution on paper, carry out a pencil and paper test, revise the algorithm if necessary. Only when you are happy that you have a working algorithm should you start to write the code.

3 The Problem - Part Two

You are now required to extend your program to cope with a group of competitors. The program should now request an initial extra item of data before commencing, namely, the number of competitors in the competition. You should provide a prompt requesting this information which the user should supply as an integer.

An example might be:

How many competitors are in the competition?: 10

Your program should now loop through the number indicated, requesting the data for each competitor and printing out their total time etc. in the format specified in part one.

Your program should also keep a record of the slowest and fastest competitors including their names and total times.

When the data for all the competitors has been provided, your program should then print out the names and times of the fastest and slowest competitors.

Don't forget the earlier remark about designing first and don't forget to use meaningful variable names and comments.

4 Effort Allocated to the Worksheet and Assessment

This week's practical, is the first of a short sequence based around the same problem. For CS23710 students, the final worksheet of this "sports competition" sequence will be assessed as the next contribution to your mark for the module.

You may need to spend an hour or so of your own time to complete this worksheet in addition to your two hour practical.

5 Submission Date (for CS23710 students)

This weeks worksheet itself will not be assessed individually. As mentioned above, this worksheet is part of a planned sequence and it is in your own interests to complete the work as it will make the following worksheets less of a challenge.

The demonstrators will keep a record of who attends the practical.

6   Character Arrays in 'C'

As we are only just covering arrays in lectures, this section provides some simple examples of how you can declare a character array and read a string into it. Note: you MUST make sure that the array is sufficiently large to hold any string that might be provided as input.

```
char name[120];

scanf("%s", &name[0]);

printf("\nCompetitors name is %s\n",&name[0]);
```

You also need to be able to copy the contents of one character array into another to complete part two of the problem listed above. You do this using a function provided as part of the standard C libraries. You also need to include a header file to bring in definitions which are required. An example piece of code is given below.

```
#include <string.h>

main ()
{ char firststring[80],secondstring[80];

    printf("Please give text :");
    scanf("%s", &firststring[0]);

    strcpy( &secondstring[0], &firststring[0] );

    printf("FirstString is %s\nSecondString is %s",
                   &secondstring[0], &firststring[0] );

}
```

ALSO NOTE: remember what has been said in lectures about needing the ampersand character in front of variable names provided as parameters to scanf.