

# TRC2400 Computer Programming ECE2071 Computer Organisation and Programming

## Laboratory Session 4

Week 5 – Semester 1 2011

### IMPORTANT – MARKING

You will receive marks for preliminary work and lab completion by completing quizzes on Blackboard. All quizzes receive equal marks and these will be scaled to give a final lab mark worth 10% of your final assessment.

You MUST complete the preliminary work quiz BEFORE midnight of the day before your lab otherwise you will receive a zero mark for the lab exercise (both preliminary and completion mark)

You must start the completion quiz before the end of your laboratory period (you will need the demonstrator to enter a password which will only be provided when you complete the lab)

### 1. Objectives

In this exercise you will develop your understanding of :

- Character strings
- Structures
- Nested structures and array structures.

### 2. Preliminary work

Before coming to the lab you should complete the preliminary work quiz on Blackboard. This week's quiz will cover your understanding of the points above and also the exercise in this practical.

### 3. This week's exercise

The following code segment defines a C structure that is used to store details of a transistor that we have in stock (manufacturer's ID, polarity (NPN or PNP), power (maximum power dissipation), current gain and the number of transistors we have in stock). It is assumed that the maximum number of different transistors is MAXSTOCKITEMS (=10), the maximum length of the manufacturer's ID is IDLEN (=10) and the length of the polarity is POLARITYLEN (=3). Details of all of the transistors in stock are stored in the second structure.

```
const int IDLEN=30;
const int POLARITYLEN=3;
const int MAXSTOCKITEMS=10;

struct TransistorRec {
    char manufacturersID[IDLEN];
    char polarity[POLARITYLEN];
    float power;
    float gain;
    int stock;
};

typedef struct TransistorRec Transistor;

struct StockRec{
    int size;
    Transistor stocklist[MAXSTOCKITEMS];
};

typedef struct StockRec Stock;
```

Write a C program main function that calls the following user defined functions:

- (a) Write a C function that reads from the user (keyboard) the information about the transistors in stock, and stores this information in the Stock structure. A sample set of input data (manufacturer's ID, polarity, maximum power, current gain, number in stock) is:

```
2N2222 NPN 0.5 75 23
BC559 PNP 0.5 125 7
TIP31B NPN 40.0 20 11
```

- (b) Write a C function that prints the number of different transistors in stock, and the following information about each transistor in tabular form: manufacturer's ID, polarity, maximum power, current gain, number in stock. This function receives as a parameter an array of structures containing the transistor details.
- (c) Write a C function that receives as a parameter a structure (a pointer to a structure is normally preferred since it uses less memory and runs faster since parameters are loaded onto the stack) containing the Stock information and prompts the user for the manufacturer's ID and then performs a linear search to find the transistor whose ID matches the search key. The function then prints the information about this transistor. If no match is found the function should print an appropriate message.

#### **4. Conclusion**

Please note that marks will not be allocated to people who do not attend their allocated lab and complete the appropriate quizzes by their deadline. Under no circumstances will marks be recorded after the laboratory period is finished.

RAR 17/2/2009; WHL 24/03/2010, RAR 23/2/2011