

C Programming

Learning Package 9

Structures

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**Introduction**

In this Learning Package, we are going to look at ways the programmers can create their own data types from other data types.

**Learning outcomes**

At the end of this Learning Package, the reader should be able to construct appropriate data structures using C commands.

**Study guide**

Session 1:

Section 9.1

SAQ 9.1

Section 9.2

SAQ 9.2

SAQ 9.3

Session 2:

Section 9.3

SAQ 9.4

Session 3:

Section 9.4

Section 9.5

Session 4:

Exercises

* 1. **Type definitions**

Read pages 228-232 from *Introduction* to the end of the section labelled

*TYPEDEF* of the module textbook.

SAQ 9.1

Fill in the missing words.

* + 1. The keyword typedef enables **n\_w** names for **d a t s** to be **c ed**. This can be useful for improving the **r ability** of the program.
    2. It is not confined to defining simple **d a t s**, but also as a means putting a name to a **c n** of data types.
    3. Using typedef can be thought of as **a ing** another data type to a list of **d a t s**. The **v e** name when declaring a new data type is replaced by the newly defined data type **n e** and the keyword **t f** added to the front of the declaration.
  1. **Structures**

Read the section labelled *Structures* from pages 232 to 236 of the module textbook.

SAQ 9.2

Fill in the missing words.

* + 1. Structures enable the programmer to **g p v s** together, even those of **d t d a t s**, under a single

**v e**.

* + 1. It is possible to have **a s** of the newly **d d** structures.

SAQ 9.3

Using the code below:

struct personal\_data { char surname[20]; char initial[4]; char post\_code[8];

}p1,p2,p3;

What do the following mean:

1. p1.surname=”Smith”;
2. post\_code is a member of the structure personal\_data.
3. The line }p1,p2,p3;
   1. **Structures and typedef**

Read the sections labelled *Structures and typedef* and *Structures within structures* from page 236-241 of the module textbook.

SAQ 9.4

Fill in the missing blanks.

* + 1. Unless the **v s** are **d d** at the **s e** time as the

**s e** template, both the **k d** *struct* and the tag name are

needed when declaring **n\_w v s**. The *t* ***f*** keyword can be put before the keyword *struct* as part of the definition to shorten the process. A **s e** can also contain other structures.

* + 1. **T f s t** {

int test1**\_** float test2**\_**

**\_**Example1;

* 1. **Structures and pointers**

Read the section labelled *Structures and pointers* from page 241-244 of the module textbook.

* 1. **Unions**

Read the section labelled Unions from on pages 244 to 247 of the module textbook.

**Exercises**

Do the following exercises: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13.

**SAQ Answers**

Fill in the missing words.

* 1. The keyword typedef enables **new** names for **data types** to be **created**. This can be useful for improving the **readability** of the program.
  2. It is not confined to defining simple **data types**, but also as a means putting a name to a **combination** of data types.
  3. Using typedef can be thought of as **adding** another data type to a list of **data types**. The **variable** name when declaring a new data type is replaced by the newly defined data type **name** and the keyword **typedef** added to the front of the declaration.

SAQ 9.2

Fill in the missing words.

1. Structures enable the programmer to **group variables** together, even those of **different data types**, under a single **variable**.
2. It is possible to have **arrays** of the newly **defined** structures.

SAQ 9.3

(a)p1.surname=”Smith”; The variable p1 of the data type personal\_data has within it an variable surname, the string “Smith” is assigned to this variable that is part of the variable p1.

(b)post\_code is a member of the structure personal\_data. The variable post\_code is defined with in the definition personal\_data. The structure personal\_data has several variables defined within it, any variables that defined to be of the type personal\_data would also have these variables. (c)The line }p1,p2,p3; Defined p1,p2,p3 to of the data type personal\_data.

SAQ 9.4

(a) Unless the **variables** are **declared** at the **same** time as the **structure** template, both the **keyword** *struct* and the tag name are needed when declaring **new variables**. The *t****ypedef*** keyword can be put before the keyword *struct* as part of the definition to shorten the process. A **structure** can also contain other structures.

(b)

**typedef struct** {

int test1**;** float test2**;**

**}**example1;