

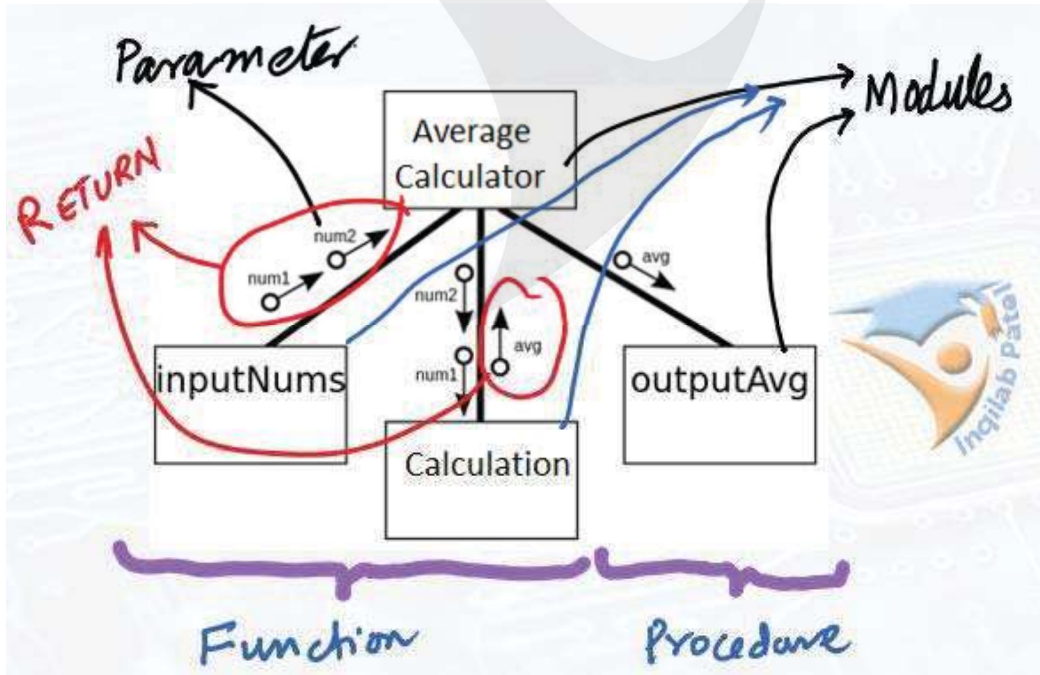


## Structure Chart

A Structure Chart is a chart which shows the breakdown of a system to its lowest manageable parts. They are used in structured programming to arrange program modules into a tree. Each module is represented by a box, which contains the module's name. The tree structure visualizes the relationships between modules, showing data transfer between modules using arrows. Structured Charts are an example of a **top-down** design where a problem (the program) is broken into its components. The tree shows the relationship between modules, showing data transfer between the models.

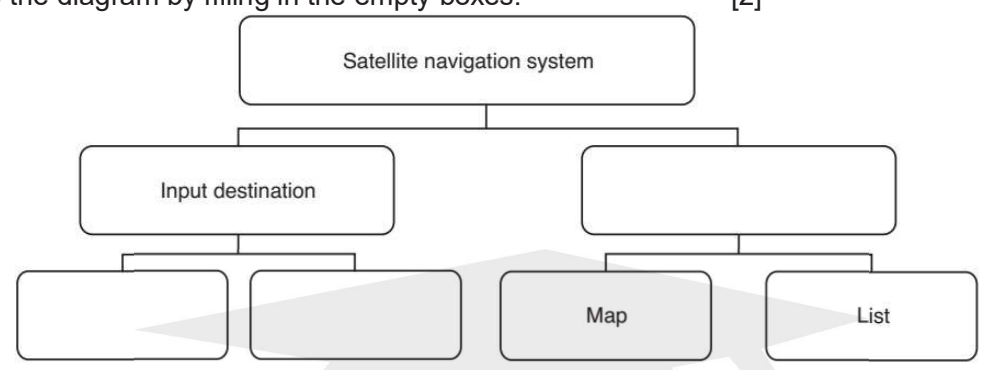
| Symbol  | Name        | Meaning   |
|---|-------------|---|
| Module Name   | Process     | Each Box represents a programming module, this might be something that calculates the average of some figures, or prints out some pay slips   |
|  | Data Couple | Data being passed from module to module that needs to be processed.   |
|  | Flag        | Check data sent to process to stop or start processes. For example when the End of a File that is being read is reached, or a flag to say whether data sent was in the correct format |

These individual problems can then be solved and combined according to the links that have been used. If the links between the different blocks are used correctly, the result is a solution to the original problem.



**10.1** A satellite navigation system works using destination details entered by the user, either a new destination or chosen from previously saved destinations. The satellite navigation system will then output directions to the destination in the form of either a visual map or a list of directions. A satellite navigation system is an example of a computer system that is made up of sub-systems. This structure diagram shows some of its sub-systems.

Complete the diagram by filling in the empty boxes. [2]



**Q 10.2** A modular program design consists of four modules:

**Module1** has three sub-tasks. Each sub-task is implemented by a single sub-routine (a function or a procedure).

The subroutine headings are defined as follows:

FUNCTION **Module2** (Weight : REAL) RETURNS BOOLEAN

PROCEDURE **Module3** (Weight : REAL, Customer : STRING, Purchased : DATE)

FUNCTION **Module4** (Purchased : DATE, Account : INTEGER) RETURNS INTEGER

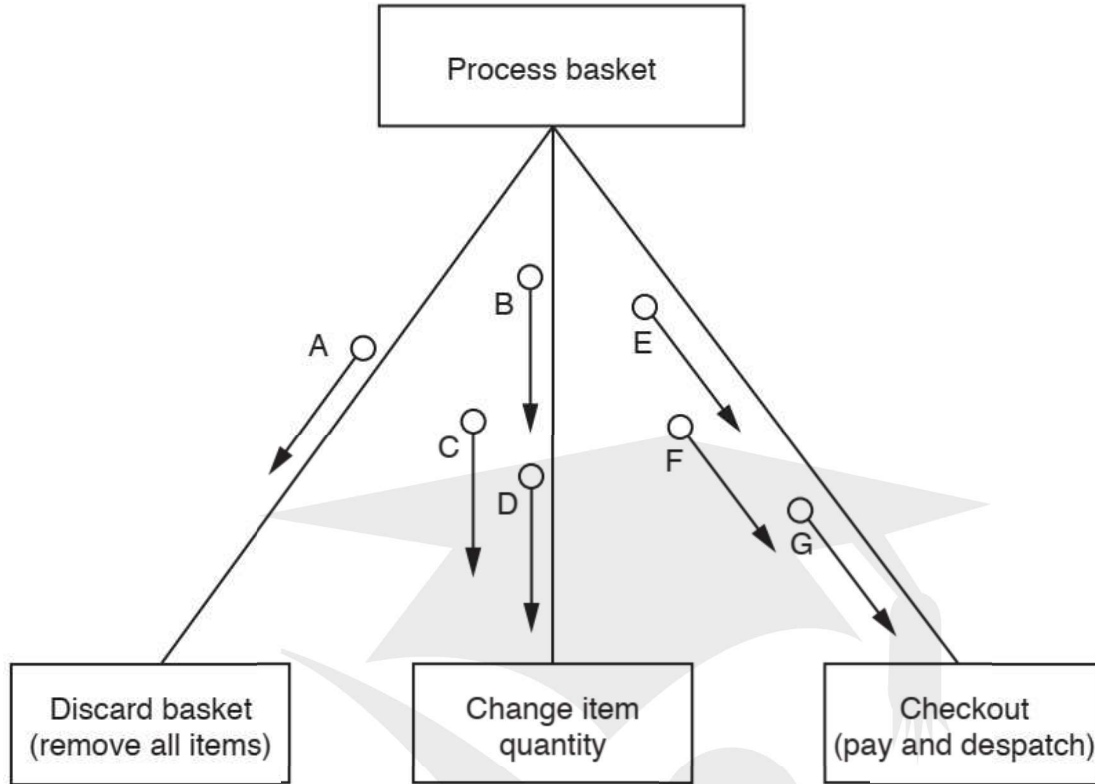
(a) State the term given to values passed between modules.  
 .....[1]

(b) Draw a structure chart to represent the program design.

Use the letters in the table to label the values passed between modules.

| Value                | Label |
|----------------------|-------|
| Boolean return value | A     |
| Integer return value | B     |
| Account              | C     |
| Customer             | D     |
| Purchased            | E     |
| Weight               | F     |

**Q 10.3** The structure chart shows part of the design of a program for an online shopping system.



(a) (i) Draw on the chart to show the following facts.

- Each of the modules at the lower level returns a Boolean parameter, X. [2]

(ii) The parameters A to G shown on the chart will be used to pass the following information.

*PaymentDetails*

*Quantity*

*BasketID*

*DeliveryAddress*

*ItemID*

Complete the following table to show the parameter and the information it represents. [3]

| Parameter | Information |
|-----------|-------------|
| A         |             |
| B         |             |
| C         |             |
| D         |             |
| E         |             |
| F         |             |
| G         |             |