Write an Details about various Advanced Data Structures with Example.

Advanced Data Structures have grown into many manifolds. The broad Catagories in advanced data Structures.

1. primitive Types:

Primitive Types are either a basic building block or are built in type Support Function.

eg:

a) Boolean data type

b) Floating - point arithmatic

c) Fixed point numbers

d) other primitive data types include character, integer, reference, .

2. Composite or non- primitive type:

It is also known as Structure or aggreagate data type and can be Constructed data and Composite data.

eg:

a) Array: It is a Collection of key or array index

b) Records: It is structured data usually in form of rows.

c) union: They are a Collection Several representations.

3. Abstract data types:

The behaviour is analyzed from the point of view of the user.

eg:

a) Container: Their have Collection of Variable

b) List: This include ordered Values of Countable Values

c) Graph: It represents pictorial repreventation of data.

4. Linear Data Structures.

5. Tree Types

6. Hash based structures

7. Graphs

Program:

```
rice price <- 40.75
Sugar price <- 30

rice quality <- 2
Sugar quantity <- 5

rice amount <- rice price * rice quality
Sugar amount <- Sugar price * Sugar quantity
total amount <- rice amount + Sugar amount

print (total amount).
```

Output:

```
> # print the total amount
> print (total amount)
[1] 231.5.
```

Numeric:

```
x <- 10.5          output: TRUE.
is.numeric (x)
```

Character:

```
x <- "Hello, World"
is character(x)    Output: TRUE
```

3. Integer:

```
x <- 5L
is.integer(x)
```

output: TRUE

4. Logical:

```
x <- TRUE
is.logical(x)
```

output: TRUE

5. Factor:

```
x <- Factor(c("Red", "green", "blue"))
is.Factor(x)
```

output: TRUE

6. Date:

```
x <- as.Date("2023-05-017")
is.Date(x)
```

output: TRUE

```
Numeric_Vector <- c(1,2,3,4,5,6)
Complex_vector <- c(1+2i, 3+4i, 5+6i, 7+8i + 9+10i + 11+12i)
logical_vector <- c(TRUE, FALSE, TRUE, TRUE, FALSE, FALSE).
Character_vector <- c("apple", "banna", "orang", "graple", "kiwi", "melon")

print(numeric_vector)
print(complex_vector)
print(logical_vector)
```

print (character_vector)

given_list <- list(g1=1:20), g2 = "python", g3 = "HTML")

g4 <- "R prog"

New_list <- append (given_list, g4)

print (New_list).

Output:

[1] 1 2 3 4 5 6

[1] 1+2i, 3+4i 5+6i 7+8i 9+10i 11+12i

[1] TRUE FALSE TRUE FALSE TRUE FALSE

[1] "apple" "banana" "orange" "grapple" "kiwi" "melon"

$g1

[1] 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

$g2

[1] "python"

$g3

[1] "HTML"

[[4]]

[1] "R prog".