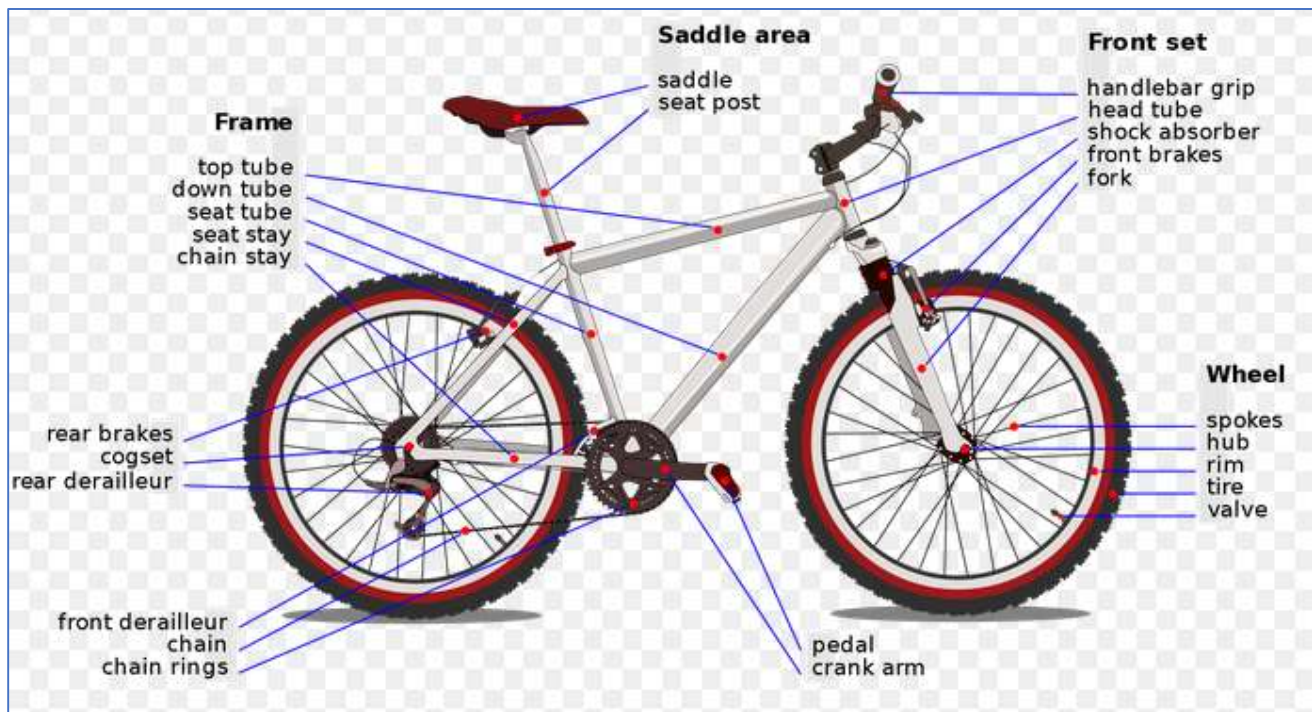


# FIT5101 Enterprise Systems

## Worksheet 02

### Material Master Management



Version 2021.00

## Scenario

Global Bikes Inc (GBI) was founded in 2001 following the merger of two bicycle manufacturers, one based in the US and the other in Germany. GBI has three lines of business: deluxe and professional touring bikes, men's and women's off-road bikes, and bike accessories. GBI sells its bikes to a network of specialized dealers throughout the world, and it procures its raw materials from a variety of suppliers globally.

GBI has two manufacturing facilities, one in the US and one in Germany. It also has three additional warehouses, two in the US and one in Germany.

GBI has more than 100 employees globally. The organization uses SAP ERP to support its processes. The company has a new bicycle for sale- Mongoose Mountain Bike. This bicycle (material ) needs to be created in the system. As part of this process a Bill of Material needs to be created to assist in the material requirements in the production of the bicycle.

## Organisational Units

During the implementation of SAP R/3 once the business **processes** to be implemented are determined the next stage is to define the **organisational units**. **Organisational units** are areas of the company where various **business processes** are implemented. Different processes can use different organisational units. The organisational units used in **Production Planning** are **Client**, **Company Code**, **Plant** and **Storage Location**.



### **Company Code**

A **company code** is an independent accounting unit. Balance sheet and profit and loss statements that are required by law are created at the company code level. In our scenario the **company code** will be US00.

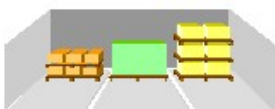


### **Plant**

A **plant** produces goods, renders services or makes goods available for distribution. It has attributes such as:

- Address
- Language
- Country
- Workday calendar

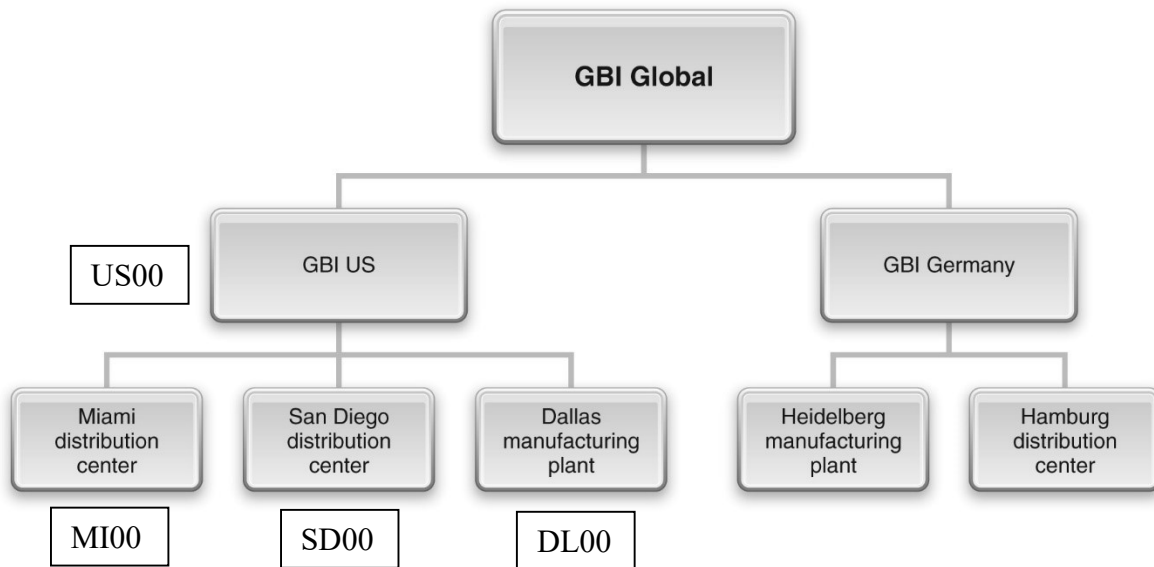
In our scenario the **plant** will be identified by DL00.



### **Storage Location**

A **storage location** defines where **materials** are stored. A **plant** could have more than one **storage location**. The **storage locations** in our scenario is FG00.

A summary of the organisational units used in our scenario are illustrated below.



## PROCESS OVERVIEW



## Material Master

The **Material Master** contains all the information on all the material that a company procures, produces, stores and sells. It is used by all of the **Logistics** components in the R/3 System such as purchasing, inventory management, materials planning, invoice verification, and so on.



Information stored in the **Material Master** can describe the component as well as how it should be treated in the business processes. Materials with similar basic attributes are grouped together by **material type**. This means you can manage your materials according to their business requirements.

## Creating Material Master records

You are going to define a new *Finished Product*, The **Mongoose Mountain Bike** with item code **ORMG1###** (Where ### your SAP user id.). It is made from the following list of subassemblies (semi-finished products) and raw materials (**These materials already exist in S/4HANA**):

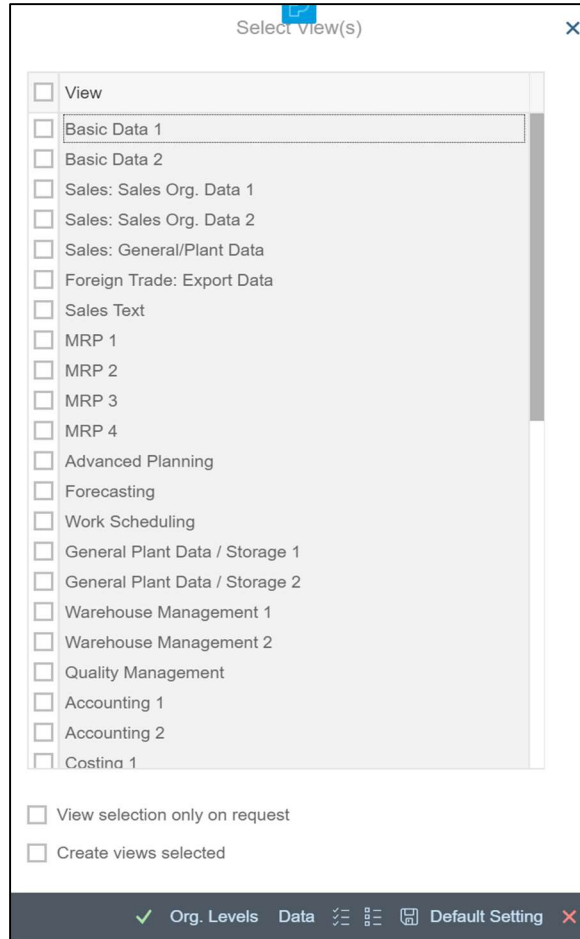
Item Code	Material Description	Material Type
ORWA1###	Wheel Assembly	Semi-Finished Product
OFFR1###	Frame	Semi-Finished Product
DGAM1###	Gear Assembly	Semi Finished Product
ORTR1###	Tire	Raw Material
ORTB1###	Tube	Raw Material
ORWH1###	Aluminium Wheel	Raw Material
HXNT1###	Hex Nut	Raw Material
LWSH1###	Lock Washer	Raw Material
BOLT1###	Socket Head Bolt	Raw Material

You need to create the Material Master record for the Mongoose bike.

1. Click  on the **Group Selection** toolbar to display the apps.
2. Click  Fiori tile to open this App.
3. Type **ORMG1###** (where ### is your logon) in the **Material** field.
4. Select Mechanical Engineering in the **Industry Sector** field.
5. Select Finished Product in the **Material Type** field

You now need to edit (maintain) the functional Views. the information stored in the Material Master record is divided into different Views so that a user can request to look at only the information that is of interest to him/her. Each user department has its own View of a Material Master record. For example, data that relates to the accounting department is stored in the Accounting View and data that relates to material planning is stored in the MRP View.

6. Click Select View(s) to display the various Views of the Material Master.



Select View(s)

- ☒ View
- ☐ Basic Data 1
- ☐ Basic Data 2
- ☐ Sales: Sales Org. Data 1
- ☐ Sales: Sales Org. Data 2
- ☐ Sales: General/Plant Data
- ☐ Foreign Trade: Export Data
- ☐ Sales Text
- ☐ MRP 1
- ☐ MRP 2
- ☐ MRP 3
- ☐ MRP 4
- ☐ Advanced Planning
- ☐ Forecasting
- ☐ Work Scheduling
- ☐ General Plant Data / Storage 1
- ☐ General Plant Data / Storage 2
- ☐ Warehouse Management 1
- ☐ Warehouse Management 2
- ☐ Quality Management
- ☐ Accounting 1
- ☐ Accounting 2
- ☐ Costing 1



☐ View selection only on request

☐ Create views selected

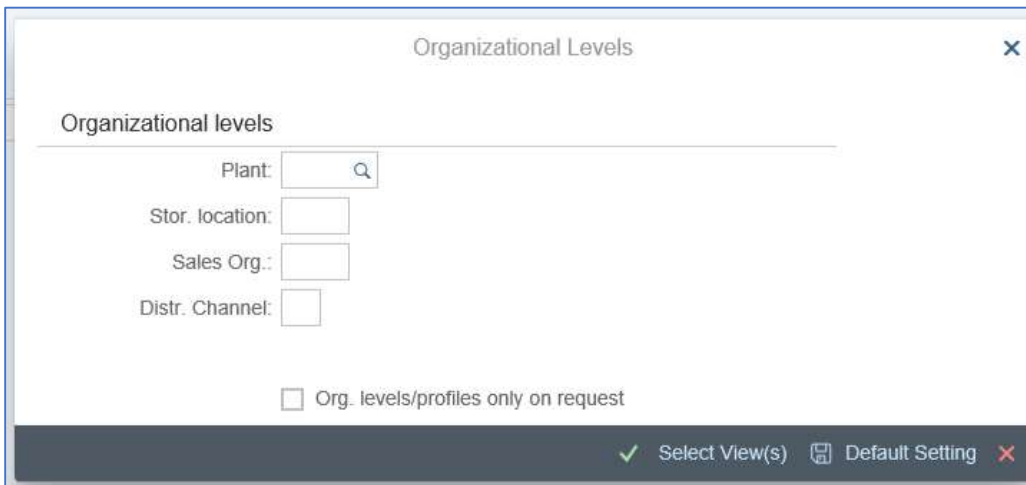
✓ Org. Levels Data Default Setting ✕

The Views which need to be created are:


- Basic Data 1
- Sales: Sales Org Data 1
- Sales: Sales Org Data 2
- Sales: General / Plant Data
- General Plant Data / Storage 1
- Accounting 1

7. Click  next to Basic Data 1 to select this View.
8. Repeat the process for the Views above to select them.
9. Click on “Create Views Selected”
10. Click  to create the Views.

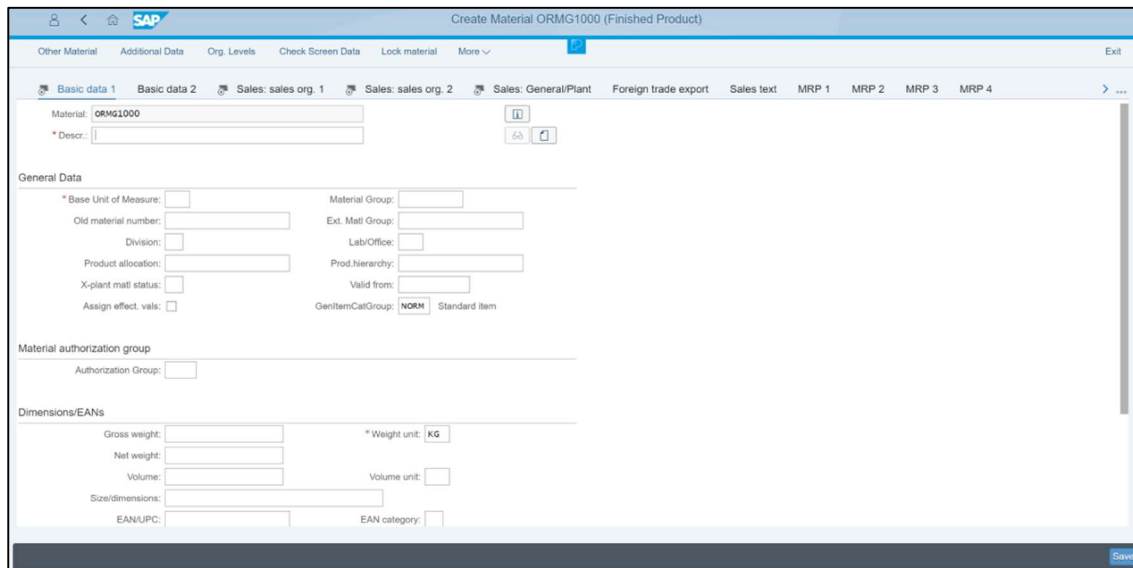
The “Organizational Levels” window is displayed.



The Basic data View of this Material is applicable to all organisational units where this Bicycle is sold. However sales data may vary from unit to unit therefore data to be maintained is organisational specific. You need to specify which organizational units you are referring to.

11. Select DL00 (Dallas) in the **Plant:** field.
12. Select FG00 (Finished Goods) in the **Storage location** field
13. Select UE00 (US East) in the **Sales Org:** field.
14. Select WH (Wholesale) in the **Distr. Channel** field.
15. Click  or press Enter.

The following screen appears. Notice that the Basic Data 1 View is displayed.



The screenshot shows the SAP 'Create Material' screen for material ORMG1000. The 'Basic data 1' view is active, displaying various input fields for material master data. The 'General Data' section includes fields for Base Unit of Measure, Material Group, Division, and others. The 'Dimensions/EANs' section includes Gross weight, Net weight, Volume, and Size/dimensions. The 'Material authorization group' section includes the Authorization Group field.

16. Type *Mongoose Mountain Bike ###* (where *###* is your logon) in the **Descr:** field.
17. Type *EA* (Each) in the **\*Base Unit of Measure:** field.
18. Select *Bikes (Finished Bicycles)* in the **Material Group:** field.
19. Select *BI (Bicycles)* in the **Division:** field.
20. Select *001 (Laboratory 1)* in the **Lab/Office:** field.
21. Type *8000* in the **Gross Weight:** field.
22. Type *8000* in the **Net Weight:** field.
23. Select *G (Grams)* in the **\*Weight unit** field.


You have now entered all the data required for the Basic data 1 View. The next View to be maintained is the Sales: sales org 1.

24. Click  **Sales: sales org. 1** to move to this View.

Note that the additional fields which are organizational unit specific appear on the screen.

25. Select *0 (Exempt)* in the ... (Tax Classification) field for EACH of the Tax Categories.


You now need to maintain the Sales: General Plant View.


26. Click  **Sales: General/Plant** to display this View.

Notice that the organizational unit (Plant Dallas) now appears on the screen as we specified this previously.


27. Select *02 (Individ requirements)* in the **Availability check:** field.

28. Select 0001 (On palettes) in the **Trans. Grp:** field.
29. Select 0002 (Hand lift) in the **Loading grp:** field.

The final View you are going to maintain at the moment is the Accounting 1. You will notice that it does not appear on the View toolbar. You can display all Views by clicking .

30. Click  to display the Views.
31. Click Accounting 1 to select this View. You may have to scroll down.
32. Select 7920 (Finished Product) in the **Valuation Class:** field.
33. Type 1500 in the **Standard Price:** field.
34. Select S (Standard) in the **\*Prc Ctrl:** field.

You have now entered required data. You now need to save the Material Master.

35. Click .  
Close the information window relating to currency conversion and reply “Yes” if prompted again to save.


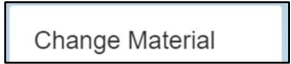

A message appears at the bottom of the screen confirming the creation of your new material. If there is no message, the material has not been created!

 Record the Material Number

36. Click  to return to the Launchpad.


## Changing Material Master records.

You need to make a change to one of the existing Semi-Finished Products, the Off Road Wheel Assembly (ORWA1###).


37. Click  on the **Group Selection** toolbar to display the apps.
38. Click  Fiori tile to open this App.
39. Type ORWA1### (where ### is your logon) in the **\*Material** field.
40. Click .

The Select Views dialog screen appears.

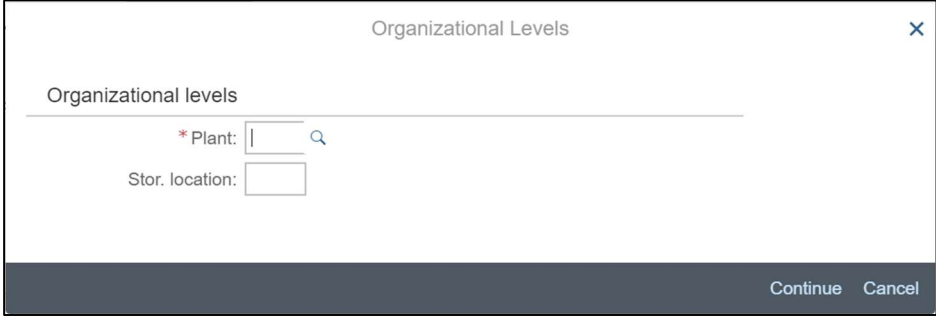


41. Click  associated with the following views to select them:

- **Basic Data 1**
- **MRP 1**
- **General Plant Data/Storage 1**

42. Click  to display these Views.

The Organisation Level dialog screen appears:



43. Type *DL00* (Dallas) in the **Plant** field.

Click  or press Enter.

44. Click “MRP1” on the View toolbar to display this view.

You are going to change the ABC Indicator field. The ABC Indicator classifies a material as an A, B, or C part according to its consumption value. This classification process is known as the ABC analysis. Based on this indicator different planning activities can be performed.

The three indicators have the following meanings:

- A - important part, high consumption value
- B - less important part, medium consumption value
- C - relatively unimportant part, low consumption value

45. Type *B* in the **ABC Indicator** field.

46. Click .

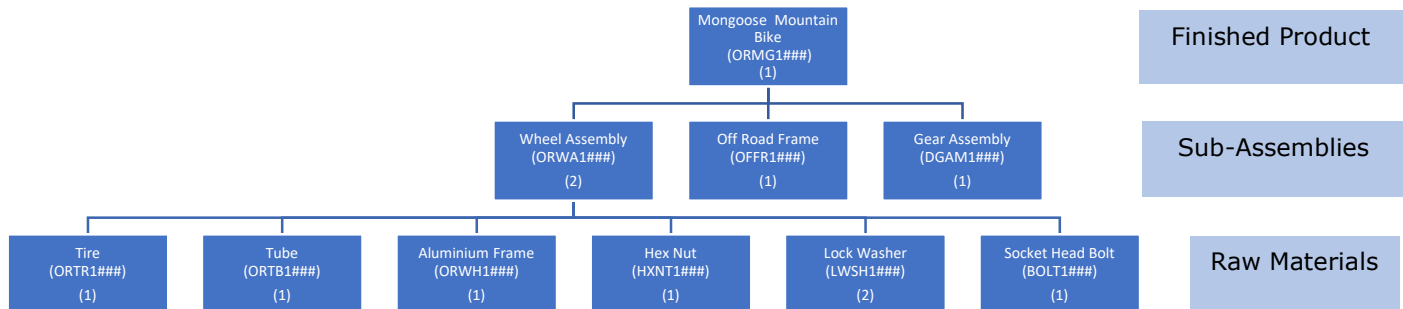
47. Click  to return to the Launchpad.

## Creating Bill of Materials (BOM)

The **BOM** is a complete formally structured list of components that make up a product or assembly. The list contains the item number of each component together with the quantity and unit of measure. It creates the relationships between an assembly and all of its direct components


The structure of the bicycle can be represented using a **Bill-of-Material**.

The **BOM** for the **Mongoose Mountain Bike** can be represented as follows:



This **BOM** shows how the bicycle is assembled from different materials. For example, The Mongoose Mountain Bike (ORMG1###) requires 2 Wheel Assembly (ORWA1###) sub-assemblies. Each Wheel Assembly (ORWA1###) is made up of 6 different raw materials -Tire, Tube, Aluminium Frame, Hex Nut, Lock Washer, Socket Head Bolt. Each component has its own material master.

To create the **Bill of Materials** for your Mongoose Mountain Bike you will define the BOM for the finished product. **The BOMs for the subassemblies have already been defined.**

46. Click  in the *Controlling* Group to open this App.
47. Type **ORMG1###** (where ### is your logon) in the **\*Material:** field.

A material can have different BOMs depending on what the BOM is going to be used for. For example the BOM for Production could be different for that for Plant Maintenance or Sales. Also BOMs can vary between Plants. You need to specify the BOM usage and Plant for the BOM you are creating.

48. Type **DL00** (Dallas) in the **Plant** field.
49. Type **1** (production) in the **\*BOM Usage:** field.
50. Press **<ENTER>** to display the Create material BOM screen.

Create material BOM: General Item Overview

Material:  Mongoose Mountain Bike 000

Plant:  Plant Dallas

Alternative BOM:

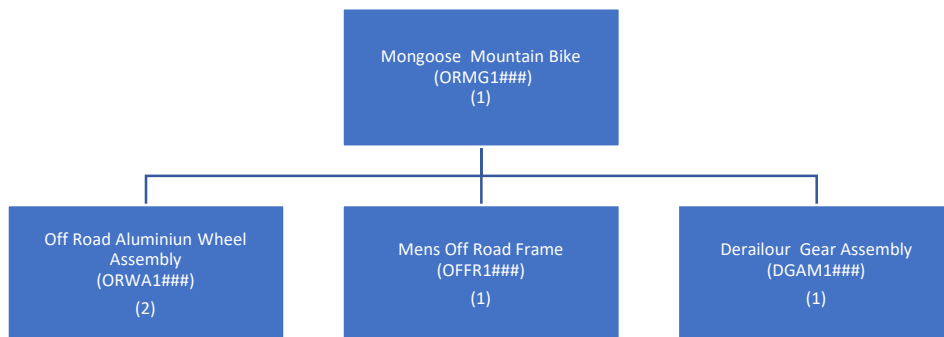
Material Document General

Item	ICt	Component	Component description	Function ID	Quantity	Un	OD	Asm	Sls	Valid From	Valid to	Change No.
<input type="checkbox"/> 0010								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0020								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0030								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0040								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0050								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0060								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0070								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0080								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0090								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0100								<input type="checkbox"/>	<input type="checkbox"/>			
<input type="checkbox"/> 0110								<input type="checkbox"/>	<input type="checkbox"/>			

Position... Initial Entry: 1 / 0

Save Cancel

You are going to create the following BOM:



51. Type The following data:

Item	Item Category (ICt)	Component	Quantity
0010	L (Stock item)	ORWA1### (where ### is your logon)	2
0020	L (Stock item)	OFFR1### (where ### is your logon)	1
0030	L (Stock item)	DGAM1### (where ### is your logon)	1

52. Press **<ENTER>** to display the component description, unit of measure and other data.

Your screen should appear similar to below:

Create material BOM: General Item Overview

Select All Deselect All Item Header Subitems New Entries Delete Item Header Details Valid More Exit

Material: **ORMG1000**  
Mongoose Mountain Bike 000

Plant: **DL00** Plant Dallas


Alternative BOM: **1**

Material Document General

Item	ICt	Component	Component description	Function ID	Quantity	Un	OD	Asm	Sls	Valid From	Valid to	Change No.
<input type="checkbox"/> 0010	L	<b>ORWA1000</b>	Off Road Aluminum Wheel Assembly		2	EA		<input checked="" type="checkbox"/>	<input type="checkbox"/>	22.03.2018	31.12.9999	
<input type="checkbox"/> 0020	L	<b>OFFR1000</b>	Men's Off Road Frame		1	EA		<input type="checkbox"/>	<input type="checkbox"/>	22.03.2018	31.12.9999	
<input type="checkbox"/> 0030	L	<b>DGAM1000</b>	Derailleur Gear Assembly		1	EA		<input type="checkbox"/>	<input type="checkbox"/>	22.03.2018	31.12.9999	
<input type="checkbox"/> 0040								<input type="checkbox"/>	<input type="checkbox"/>			

53. Click .

A message appears confirming the creation of the BOM.

54. Click  to return to the Launchpad.

✎ You have created the BOM for the Mongoose Mountain Bike. Why didn't you have to create a BOM for the Wheel Assembly? How would Production know what makes up the Wheel Assembly?

## Displaying Sub Assembly BOM

The answer to the above question is that the BOM for the Wheel Assembly had already been created. The system know that when a Wheel Assembly is required then the BOM for the Wheel Assembly is automatically applied. Therefore, a BOM can be made up of many other BOMs. To display a BOM:

55. Click  in the Controlling Group.

56. Type **ORMG1###** (where ### is your logon) in the **\*Material:** field.

57. Type **DL00** (Dallas) in the **Plant** field.

58. Type **1** (production) in the **\*BOM Usage:** field.

59. Press **<ENTER>** to display the Display material BOM screen.

Your BOM appears on screen. From this screen you can view the BOM of a sub assembly if it exists.

60. Click  of the Off Road Aluminum Wheel Assembly item to select it.

61. Click  to display the menu.

62. Choose Extras ➔ Display Assembly to display a dialog screen.

63. Click

Continue

The BOM for the Off Road Aluminum Wheel Assembly now appears on the screen. As mentioned this BOM had been created previously as it might be used in the BOMs of other bikes.

Display material BOM: General Item Overview

Select All Deselect All Item Header Subitems Header Details Validity More ▾ Exit

Material: **ORWA1000**  
Off Road Aluminum Wheel Assembly  
Plant: **DL00** Plant Dallas  
Alternative BOM: **1**

Material Document General

Item	ICt	Component	Component description	Function ID	Quantity	Un	OD	Asm	Slis	Valid From	Valid to	Change No.
<input type="checkbox"/>	0010	L	<b>ORTR1000</b>	Off Road Tire	2	EA		<input type="checkbox"/>	<input type="checkbox"/>	01.01.2010	31.12.9999	
<input type="checkbox"/>	0020	L	<b>ORTR1000</b>	Off Road Tube	2	EA		<input type="checkbox"/>	<input type="checkbox"/>	01.01.2010	31.12.9999	
<input type="checkbox"/>	0030	L	<b>ORWH1000</b>	Off Road Aluminum Wheel	2	EA		<input type="checkbox"/>	<input type="checkbox"/>	01.01.2010	31.12.9999	
<input type="checkbox"/>	0040	L	<b>HXNT1000</b>	Hex Nut 5 mm	2	EA		<input type="checkbox"/>	<input type="checkbox"/>	01.01.2010	31.12.9999	
<input type="checkbox"/>	0050	L	<b>LWSH1000</b>	Lock Washer 5 mm	4	EA		<input type="checkbox"/>	<input type="checkbox"/>	01.01.2010	31.12.9999	
<input type="checkbox"/>	0060	L	<b>BOLT1000</b>	Socket Head Bolt 5x20mm	2	EA		<input type="checkbox"/>	<input type="checkbox"/>	01.01.2010	31.12.9999	

64. Click



to return to the Launchpad.

## Work Centers

Now that you have defined the materials (BOM) to be used in making the Mongoose Mountain Bike, you need to define the location in the plant in which the manufacturing processes take place. Work Centers are the master data which represent real machines, Production Lines, Assembly Work Center, etc. Manufacturing activity or Operations are carried out at a Work Center. In the case study there are 4 Work Centers involved in the production of your bike. These are Assembly, Turning, Painting and Testing. To create a work center:

65. Click

Create Work Center

in the Production Planning and Execution Group.

66. Type

DL00 (Dallas) in the **\*Plant** field.

67. Type

WC1-### (where ### is your logon) in the **Work Center:** field.

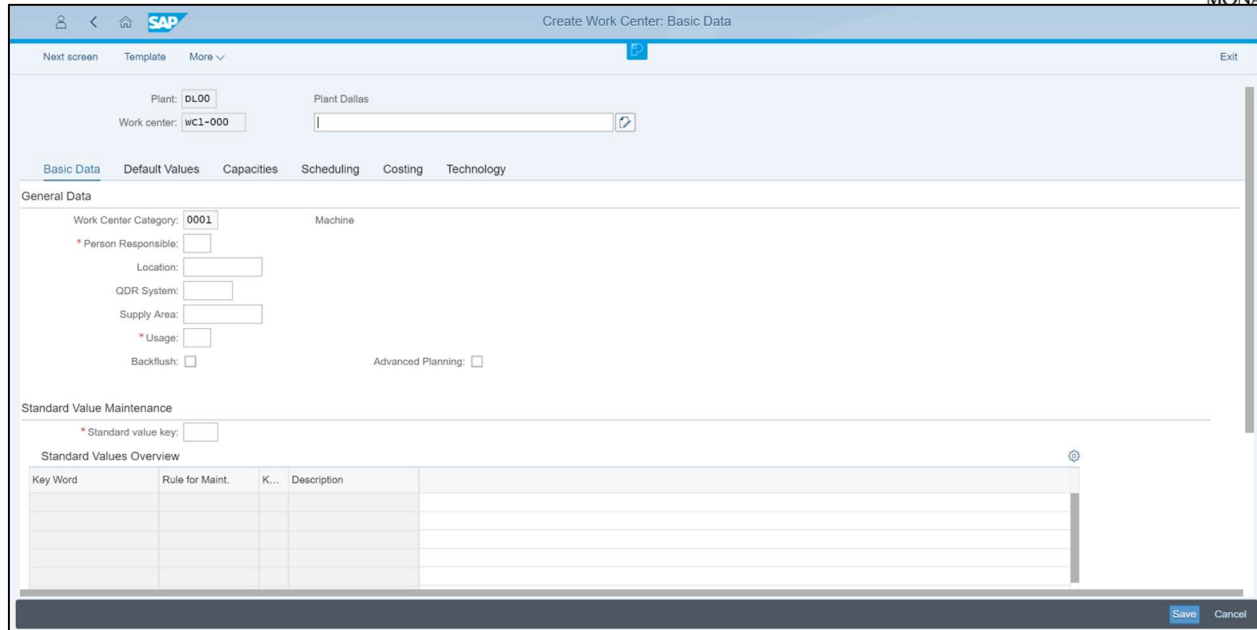
68. Select

0001 (Machine) in the **Work Center Category:** field.

69. Click

Next screen

The Create Work Center: Basic Data screen appears:



70. Type *Assembly* as the work center description (where cursor is flashing).

71. Type *000* (Steve Barton) in the **Person Responsible:** field.

72. Type *001* (only routings) in the **\*Usage:** field.

73. Type *SAP1* (Normal production) in the **Standard value key:** field.

74. Click **Costing** to move to this screen.

75. Type *NAPR1000* in the **\*Cost Centre:** field.

Notice on this screen you can specify the costs associated with setup, Machine and labour for this Work Center. You could also specify the capacity of each Work Center. This assists the system to plan the production of the material.

76. Click **Save**.

A dialog screen appears to confirm the Work Center creation.

✎ Record your Work Center number. \_\_\_\_\_

You now need to create the remaining Work Centers.

77. Repeat this process for the remaining three work centres. In all cases use the same data as for WC1 and the following descriptions:

Work Centre	Description
WC2-###	Turning
WC3-###	Painting
WC4-###	Testing

78. Click  to return to the Launchpad.

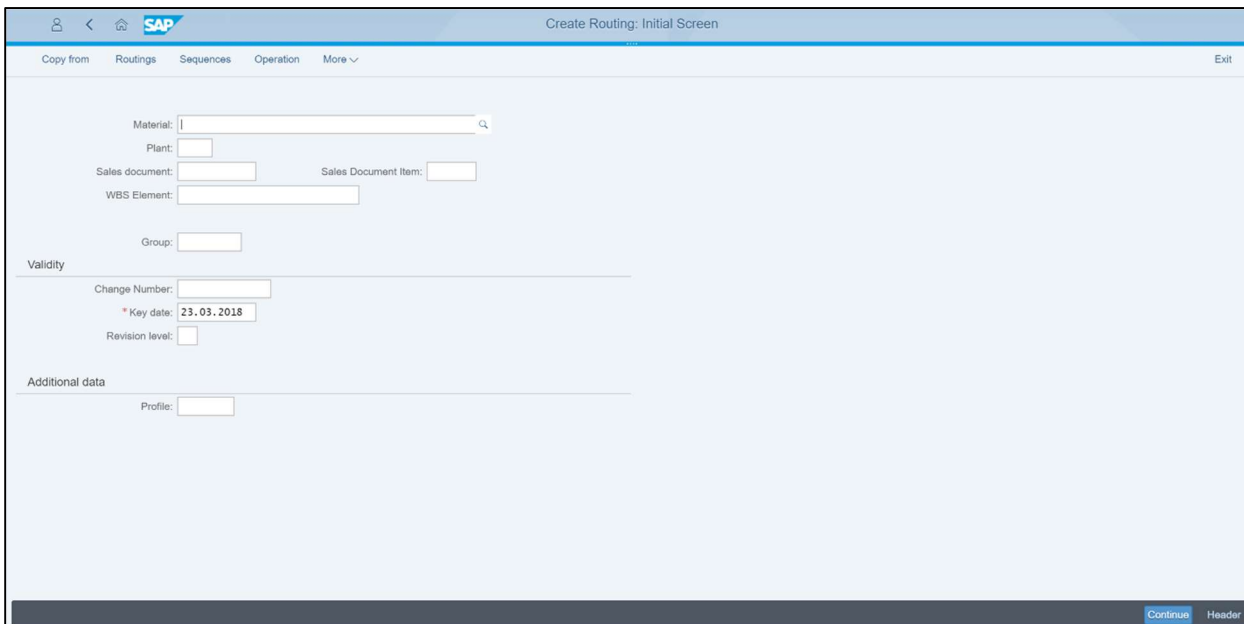
You have now created the Work Centers for the production of the Mongoose Mountain Bike. As mentioned previously this is where the different work activities take place in a Plant. You now need to specify the sequence in which the Work Centers are utilised. This is referred to as the Routings.

## Routings

A routing is a description of which operations or list of activities has to be carried out during the production and planning process. It also tells what order or sequence the activities/operations needs to be carried out at work centers or machines. There may be several alternative routings for a product.

79. Click  in the Production Planning and Execution Group.


The Create Routing screen appears:



The screenshot shows the 'Create Routing: Initial Screen' in SAP. The interface includes a top navigation bar with 'Copy from', 'Routings', 'Sequences', 'Operation', and 'More'. Below this, there are several input fields: 'Material:' (with a search icon), 'Plant:', 'Sales document:', 'Sales Document item:', 'WBS Element:', 'Group:', 'Change Number:', '\* Key date: 23.03.2018', 'Revision level:', and 'Profile:'. A 'Continue' button is located at the bottom right of the screen.

80. Type **ORMG1###** (where ### is your logon) (Mongoose Mountain Bike) in the **Material:** field.

81. Type **DL00** (Dallas) in the **Plant:** field.

82. Click  to display the Header screen.

83. Type **1** (Production) in the **Usage:** field.

84. Type 3 (Released for Costing) in the **Overall Status:** field.

You now need to specify the order of operations.

85. Click  to display this screen.

86. Type the following details for each operation:

87.

Operation	Work Center	Control	Description
0010	WC1-###	PP01	Assemble Raw Materials
0020	WC2-###	PP01	Final Assembly
0030	WC3-###	PP01	Paint
0040	WC4-###	PP01	Final Test

88. Click .

## Display Routing

You can display the routing and associated dependencies.

89. Click  to return to the Launchpad.

90. Click .

91. Type ORMG1### in the Materials: field

92. Type DL00 (Dallas) in the Plant: field.

93. Click .

Your Routing appears on the screen:



Display Routing: Operation Overview

Material: ORMG1000      Mongoose Mountain BGrp.Count1

Sequence: 0

Operation Overview

Op...	SOP	Work ce...	Plant	Co...	Standar...	Description	Lo...	PRT	Cl...	O...	P...	C...	S...	Base Quantity	U...	Setup	Unit	Activit...	Machine	Unit	Activit...	Labor
<input type="checkbox"/>	0010	WC1-000	DL00	PP01		Assemble Raw Materials								1	EA	0.000		LABOR	0.000			0.000
<input type="checkbox"/>	0020	WC2-000	DL00	PP01		Final Assembly								1	EA	0.000			0.000			0.000
<input type="checkbox"/>	0030	WC3-000	DL00	PP01		Paint								1	EA	0.000			0.000			0.000
<input type="checkbox"/>	0040	WC4-000	DL00	PP01		Final Test								1	EA	0.000			0.000			0.000

From this screen you can view the required materials.

94. Click ☐ for Oper... 0010 to select this item.

95. Click **Allocation** to view the required materials.

Routing Display: Material Component Overview

Material: ORMG1000      Mongoose Mountain Bike 000

Plant: DL00

Group: 50021981      Sequence: 0      Mongoose Mountain Bike 000

BOM: 00022002      Alt. BOM: 1

Item Overview

P...	Le...	Path	It...	Component	Quantity	Sort String	U...	It...	B...	Activity	Seq.	Material Description	Item Text	Item text	Compon...
<input type="checkbox"/>	0	0	0010	ORWA1000	2		EA	L				Off Road Aluminum Wheel Assembly			00022002 1
<input type="checkbox"/>	0	0	0020	OFFR1000	1		EA	L				Men's Off Road Frame			00022002 1
<input type="checkbox"/>	0	0	0030	DGAM1000	1		EA	L				Derailleur Gear Assembly			00022002 1

✎ How did the system know to display this information?

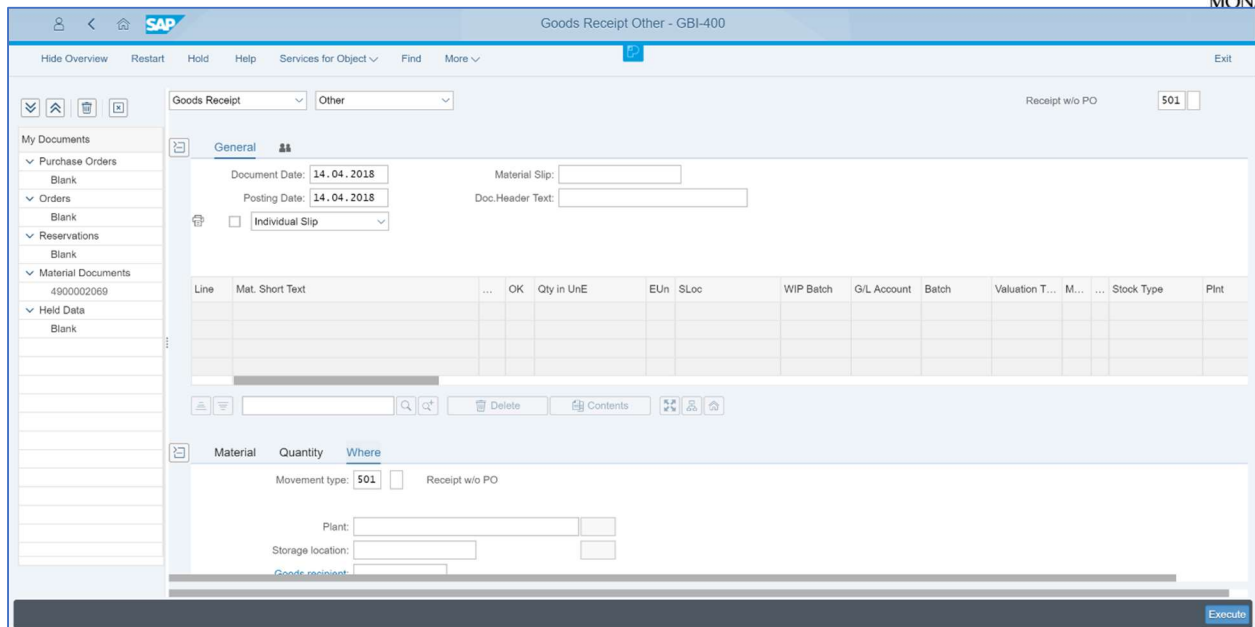
## Add Initial Stock

Normally once the Material design and BOM had been finalised materials would be procured to produce the bike. At the moment the production execution process is outside the scope of this tutorial. However we will assume the production process has been completed and the completed bicycles need to be added to stock to be available for sales. To add stock to inventory:

96. Click  to return to the Launchpad.

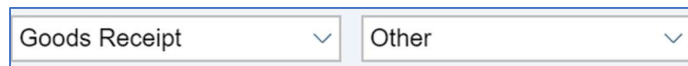
97. Click **Post Goods Movement** in the Production Planning & Execution Group

A screen similar to the one below appears:



The screenshot shows the SAP 'Goods Receipt Other - GBI-400' screen. The top bar includes navigation icons and the title. Below the title bar, there are tabs for 'General' and 'Where'. The 'General' tab is active, showing fields for 'Document Date' (14.04.2018), 'Posting Date' (14.04.2018), 'Material Slip', and 'Doc. Header Text'. A table with columns 'Line', 'Mat. Short Text', 'OK', 'Qty in UnE', 'EUn', 'SLoc', 'WIP Batch', 'G/L Account', 'Batch', 'Valuation T...', 'M...', 'Stock Type', and 'Print' is visible. The 'Where' tab is also visible, showing fields for 'Movement type' (501), 'Receipt w/o PO', 'Plant', and 'Storage location'. The bottom right corner has an 'Execute' button.

98. Select *Other* in the reference document field



The screenshot shows the 'Goods Receipt' and 'Other' dropdown menus in the reference document field.

99. Type 561 (Receipt per entry of stock balances for unrestricted use) in **Receipt w/o PO** field.

100. Click [Material](#) to enter the material details.

101. Type *ORMG1###* (where ### is your logon) in the **Material** field.

102. Click [Quantity](#) to move to this screen.

103. Type *10* in the **Qty in Unit of Entry** field.

104. Click [Where](#) to indicate where the stock will be stored.

105. Check that the **Movement Type** field is 501 (Receipt w/o PO).

106. Type *DL00* (Plant Dallas) in the **Plant** field.

107. Type *FG00* (finished goods) in the storage Location: field.

108. Click **< ENTER >** then [Post](#) to add the stock to inventory (Ignore any warnings).  
A dialog screen appears to indicate that the Material Document has been successfully created.

109. Use the **Display Stock Overview** App in the **Sales and Distribution** group to check the stock levels. What are the different types of stock and the associated stock levels?

You have completed the exercise on Material Master Data. You should be able to explain the difference between:

- Material
- Finished Product
- Sub-assembly
- Raw Material
- Bill of Materials (BOM)
- Work Center
- Routing

Once the details have been entered for these master data items then a planner, based on the demand for a bike, can determine how long it takes to manufacture, when manufacturing can start, what materials are required, where the operations will take place, and the cost of manufacturing.