

Bill of Materials, Budgeting and Purchase Requisitions for Senior Design

<http://www.srdesign.uncc.edu/student.html>

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Outline

- Introduction – Motivation
 - Bill of Materials
 - Engineering Budget
 - UNCC Purchase Requisition
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Introduction

A budget is essential in determining and managing a project's cost.

It categorizes where money on a particular project is being spent.

A bill of material identifies the individual pieces of a product that must be purchased or manufactured.

A purchase requisition is the paperwork required to initiate a purchase.

Bill of Materials (from Wikipedia)

A **bill of materials** or **bill of material** (abbreviated "**BOM**") describes a product in terms of its assemblies, sub-assemblies, and basic parts.

Basically consisting of a list of parts, a BOM is an essential part of the design and manufacture of any product.

Parts required to build a deliverable end product are included on the BOM. Developmental tools are not included (i.e. software, tools, etc).

Bill of Materials (continued)

Often, BOMs contain hierarchical information with a top level BOM describing a list of components and sub-assemblies.

PC Example: Top Level BOM

- 1) shipping box
- 2) manual
- 3) packaging
- 4) packaging labels
- 5) actual PC

PC Sub-Assembly BOM

- 1) motherboard
- 2) power supply
- 3) processor

This increasing level of detail continues for all sub-assemblies until it reaches its constituent parts (like resistors or processors), or modules that are out of the scope of the BOM (like the parts that make up a fan that is brought in as a module from another manufacturer).

Bill of Materials (continued)

BOMs are important, since without a basic knowledge of how many parts a product needs, there is no way of knowing how many units of that part you need to buy.

Bill of Materials Example: Man Powered Scooter



Main Component Groups

1. Handle Bar Assembly
2. Steering Assembly
3. Frame Assembly
4. Front Wheel Assembly
5. Rear Wheel Assembly
6. Brake Assembly

Top Level Bill of Materials

**UNC Charlotte Senior Design
Project Bill of Materials for End Project
10/06/2006, Rev A**

Project: Scooter

Top Level

Item	Qty	Price per	Total	Source
Handle Bar Assembly	1	\$3.39	\$3.39	Sub-Assembly
Steering Assembly	1	\$6.29	\$6.29	Sub-Assembly
Frame Assembly	1	\$7.79	\$7.79	Sub-Assembly
Front Wheel Assembly	1	\$6.15	\$6.15	Sub-Assembly
Rear Wheel Assembly	1	\$5.79	\$5.79	Sub-Assembly
Brake Assembly	1	\$5.12	\$5.12	Sub-Assembly
Total			\$34.53	

Front Tire Assembly Bill of Materials

**UNC Charlotte Senior Design
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Project: Scooter

Front Tire Assembly

Item	Qty	Price per	Total	Source
Tire	1	\$1.12	\$1.12	ABC Tire Company
Rim	1	\$1.26	\$1.26	XYZ Rim Company
Valve Stem	1	\$0.11	\$0.11	McMaster Carr
Valve Stem Cap	1	\$0.06	\$0.06	McMaster Carr
5/16-18 Axle Nut	2	\$0.13	\$0.26	McMaster Carr
5/16 Flat Washer	2	\$0.04	\$0.08	McMaster Carr
Brass Bushing	1	\$1.01	\$1.01	MSC Industrial
Lubricant	1	\$0.14	\$0.14	MSC Industrial
Axle	1	\$2.11	\$2.11	In-House
Total			\$6.15	

Budget (from Webster's)

A **Budget** is:

1. an estimate, often itemized, of expected income and expense for a given period in the future.
 2. a plan of operations based on such an estimate.
 3. an itemized allotment of funds, time, etc., for a given period.
 4. the total sum of money set aside or needed for a purpose:
the construction budget.
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Budget (Continued)

**UNC Charlotte Senior Design
Project Budget
10/6/06, Rev A**

Project: Scooter

Category/Item		qty	price per	total	
Development Materials					
	1/2" diameter 2 flute end-mill	1	\$18.79	\$18.79	
	5/16-18 die	1	\$5.83	\$5.83	
	1/8" diameter TIG welding tungsten	3	\$1.12	\$3.36	
	1/16" diameter T-6061 welding rod	10	\$2.79	\$27.90	
BOM materials for demonstration					
	From Top Level BOM sheet, needed xx/xx/xx			\$34.53	
Parts and materials total					\$90.41
Labor					
	Student time	500	\$100.00	\$50,000.00	
	Mentor time	25	\$150.00	\$3,750.00	
	Sponsor time	25	\$150.00	\$3,750.00	
Total labor					\$57,500.00
Total parts, materials, and labor					\$57,590.41

Labor Overhead

What's included in labor overhead (i.e. hourly rate)

- Your salary
 - Your health benefits
 - Your vacation pay
 - Your taxes (FICA)
 - Your retirement (i.e. 401K match)
 - Corporate PC and PC support (i.e. networking, software)
 - A portion of your manager's labor
 - A portion of the corporation's general expenses (i.e. rent, heating, taxes).
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UNCC Purchase Requisition

Only 1 vendor per purchase requisition

PURCHASE REQUISITION

 Prepared
 DATE: 10/6/06
 BSS Recvd
 DATE:

 PURCHASE ORDER NO. _____
 REQUISITION NO. _____
 FUND / INDEX NUMBER _____
 DEPARTMENT _____
 BLDG. / ROOM _____
 MARK FOR _____
 TELEPHONE _____

 Project: Scooter
 Senior Design Program
 Senior Design Program

 FORWARD THIS FORM TO YOUR
 DEPARTMENTAL BSS / OTHER
 RESPONSIBLE PARTY

ITEM NO.	QUAN-TITY	UNIT	DESCRIPTION	UNIT PRICE	TOTAL PRICE
1	1	1	Valve Stem PN: 12357A123	0.11	0.11
2	1	1	Valve Stem Cap PN: 45612A98	0.06	0.06
3	1	10	5/16-16 Axle Nut PN: 58647A34	1.30	1.30
4	1	10	5/16 Flat Washer PN: 68974A100	0.40	0.40
5					
6					
7					
8					
9					
10					

 Funds for this purpose in the amount of order total will be reserved in the account(s) listed.
 (If funded from more than one account, list accounts and amounts OR percentage by account.)

Account	%	Amount
Acct 1		
Acct 2		
Acct 3		

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PG 1 SUB-TOTAL	1.87
PG 2 SUB-TOTAL	
Tax (if needed)	
ORDER TOTAL	1.87

Suggested Vendors:

McMaster Carr		

 Sole Source, attach justification on next sheet or attach as separate file.
 Form attached to your email indicates your approval. If manually submitted, an authorized individual's signature is required: _____

What is next?

October 13th:

Designs and Design Reviews Lecture

Project Risk Assessments are due
