2.2.3 Function Point Estimate

For an initial estimation of project size, we used an Estimated Function Point Count. The expected processes and files are listed and categorized by programming language and component type: External Input (EI), External Output (EO), External Inquiry (EQ), Internal Logical File (ILF), or External Interface File (EIF). Since this is an initial estimation before formal specification, all files are considered to have low complexity and processes are assumed to be of average complexity. The components are then weighted, yielding the Unadjusted Function Points (UAF). The Value Adjustment Factor (VAF) was determined by given requirements and general expectations of professional e-commerce website capability. When the VAF is multiplied with the UAF, we are given the Function Points (FP). Size, as measured in Source Lines of Code (SLOC), was then calculated with median Function Point Gearing Factors (Quantitative Software Management, Inc.). HTML and Javascript factors were averaged together, and C++ was used as a comparable language factor to PHP. It should be noted that this Function Point Count does not make allowance for user interface necessities.

Process and File Attributes

Process / File	Component Type	Language
Files		
Art Collection	Internal Logical File	SQL
Administration Data	Internal Logical File	SQL
User Accounts	Internal Logical File	SQL
Web Resources	External Interface File	SQL
Webpages		
Homepage	External Inquiry	HTML / Javascript
Account Page	External Inquiry	HTML / Javascript
Administration Page	External Inquiry	HTML / Javascript
Categories Page	External Inquiry	HTML / Javascript

Gallery Page	External Inquiry	HTML / Javascript
Information Page	External Inquiry	HTML / Javascript
Shopping Cart Page	External Inquiry	HTML / Javascript
Search	External Inquiry	PHP
Personal Online Help		
Request Help	External Input	Java
Help Queue	External Inquiry	Java
Send Message	External Input	Java
Receive Message	External Inquiry	Java
Account		
Login	External Output	PHP
Logout	External Inquiry	PHP
New	External Input	PHP
New – Verification	External Input	PHP
Edit	External Input	PHP
Delete	External Input	PHP
Report	External Inquiry	PHP
Administration		
Login	External Output	PHP
Logout	External Inquiry	PHP
Edit Password	External Input	PHP
Account Report	External Inquiry	PHP
Shopping Report	External Output	PHP
Shopping Cart		
Display	External Output	PHP
Add	External Input	PHP
Edit	External Input	PHP
Clear	External Input	PHP
Buy	External Input	PHP
Credit Verification	External Input	PHP

Unadjusted Function Points

HTML / Javascript

EI	EO	EQ	ILF	EIF	
0	0	7	0	0	
0 +	0 +	7 * 4 +	0 +	0 =	28

Java

EI	EO	EQ	ILF	EIF
2	0	2	0	0

2 * 4 +	0 +	2 * 4 +	0 +	0 =	16

PHP

EI	EO	EQ	ILF	EIF	
10	4	5	0	0	
10 * 4 +	4 * 5 +	5 * 4 +	0 +	0 =	80

SQL

EI	EO	EQ	ILF	EIF	
0	0	0	3	1	
0 +	0 +	0 +	3 * 7 +	1 * 5 =	26

Value Adjustment Factor

Data Communications	4
Distributed Functions	2
Performance	4
Heavily Used Configuration	3
Transaction Rate	4
Online Data Entry	3
End User Efficiency	4
Online Update	4
Complex Processing	3
Reusability	2
Installation Ease	1
Operational Ease	1
Multiple Sites	1
Facilitate Change	3

VAF = 0.65 + 0.1 * $\sum$ = 0.65 + 0.01 * 39 = 1.04

Function Points

Function Points = UAF * VAF

HTML / Javascript
28 * 1.04 = 29.12 FP

Java
16 * 1.04 = 16.64 FP

PHP
80 * 1.04 = 83.2 FP

SQL
26 * 1.04 = 27.04 FP

Source Lines of Code

HTML / Javascript
29.12 * avg(53, 63) = 1,688.96

Java
16.64 * 63 = 1,048.32

PHP
83.2 * 53 = 4,409.6

SQL
27.04 * 37 = 1,000.48

Total SLOC = 8,147.36

2.2.4 COCOMO Analysis

The cost estimation of our project is handled by the Constructive Cost Model (COCOMO). Though considered obsolete to the more advanced COCOMOII, the original COCOMO remains a familiar and straightforward method of software cost estimation.

The development mode is chosen to be Semidetached. Though the project team is small, this development mode takes precedence due to the unfamiliar nature of the development environment. The Thousands of Delivered Source Instructions (KDSI) is taken by the division of 1,000 into the SLOC determined from the Function Point Count. Cost drivers were selected to adjust the nominal effort: low applications experience, low virtual machine experience, and low programming language experience. Average Cost per Person Month will be $15,000 (Sommerville 529). Additionally, basic hardware and software costs are estimated at $1,000 with an annual maintenance cost of $200.

Taken as is, the high COCOMO estimations cannot be directly used to schedule within the constraints of the short-term project goals and current resources. However, this early COCOMO estimation does not take into account negotiated final specifications or the use of pre-generated code and other available resources.

Effort = 3.0 * 8.1474 ^ 1.12 = 31.4 Person Months

Adjusted Effort = 31.4 * 1.13 * 1.10 * 1.07 = 41.8

Development Costs = 41.8 * 15,000 = $627,000

Hardware and Software Costs = $1,000

Annual Maintenance Costs = $200

Total Development Costs = $628,200