COCOMOII

Unadjusted Function Points

Reference information:

DET: Data Element Type, a unique piece of data

FTR: Full Text Retrieval, a Master File that is read for a process

RET: Record Element Type, a subgroup of data within a Master File

Inputs

An input is a process that originates outside the program. Inputs control the program's data in some way; for example, an input may update the program's settings file.

Complexity Key:

FTRs	DETs		
	1-4	5-15	16 or more
0-1	Low	Low	Average
2	Low	Average	High
3 or more	Average	High	High

Function Points Key:

Low	3
Average	4
High	6

Process	DET Names	# of DETs	FTR Names	# of FTRs	Resulting Complexity	# of FPs
Create Contact	ContactId, FirstName, LastName, JobTitle, HomePhone, WorkPhone, HomeAddress, WorkAddress, eMail, Birthday	10	Contacts Table	1	Low	3
Edit Contact	FirstName, LastName, JobTitle, HomePhone, WorkPhone, HomeAddress, WorkAddress, eMail, Birthday	9	Contacts Table	1	Low	3
Delete Contact	ContactId	1	Reports, Departments, Contacts Tables	3	Average	4
Create Department	DepartmentId, DepartmentTitle, Phone, MailingAddress	4	Departments, Contacts Tables	2	Low	3
Edit Department	DepartmentTitle, Phone, MailingAddress	3	Departments, Contacts Tables	2	Low	3
Delete Department	DepartmentId	1	Reports, Departments Tables	2	Low	3
Create Report	ReportId, ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	12	Reports, Departments, Contacts Tables	3	High	6

Edit Report	ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	11	Reports, Departments, Contacts Tables	3	High	6
Delete Report	ReportId	1	Reports Table	1	Low	3
Update Settings	SQL_DBType, SQL_Server, SQL_DBName, SQL_Username, SQL_Password, Email_Server, Email_Username, Email_Password	8	Settings File	1	Low	3
					Total Input Function Points:	37

Outputs

An output is any process that yields a result which is sent outside of the program.

Complexity Key:					*Function Points Key:*	
FTRs	DETs				Low	4
	1-5	6-19	20 or more		Average	5
0-1	Low	Low	Average		High	7
2-3	Low	Average	High			
4 or more	Average	High	High			

Process	DET Names	# of DETs	FTR Names	# of FTRs	Resulting Complexity	# of FPs
Email Report Results	ReportId, ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	12	Reports, Departments, Contacts Tables	3	Average	5
					Total Output Function Points:	5

Master Files

Master files, also called internal logic files, are data stored and maintained by the program.

Complexity Key:					*Function Points Key:*	
RETs	DETs				Low	7
	1-19	20-50	51 or more		Average	10
1	Low	Low	Average		High	15
2-5	Low	Average	High			
6 or more	Average	High	High			

Master File Name	DET Names	# of DETs	RET Names	# of RETs	Resulting Complexity	# of FPs
Contacts Table	ContactId, FirstName, LastName, JobTitle, HomePhone, WorkPhone, HomeAddress, WorkAddress, eMail, Birthday	10	Contacts	1	Low	7

Departments Table	DepartmentId, DepartmentTitle, Phone, MailingAddress; DepartmentId, ContactId	6	Departments; Department Associations	2	Low	7
Reports Table	ReportId, ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults; ReportId, DepartmentId; ReportId, ContactId	16	Reports; Report Associations Departments; Report Associations Contacts	3	Low	7
Settings File	SQL_DBType, SQL_Server, SQL_DBName, SQL_Username, SQL_Password, Email_Server, Email_Username, Email_Password	8	Settings	1	Low	7
					Total Master File Function Points:	28

Queries

A query, or inquiry, is a request prompted by the user, returning within the application domain (for example, previewing a result).

Complexity Key:					*Function Points Key:*	
FTRs	DETs				Low	3
	1-5	6-19	20 or more		Average	4
0-1	Low	Low	Average		High	6
2-3	Low	Average	High			
4 or more	Average	High	High			

Process	DET Names	# of DETs	FTR Names	# of FTRs	Resulting Complexity	# of FPs
Preview Report Results	ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	11	Reports Table	1	Low	3
Search and Display Contacts	FirstName, LastName	2	Contacts Table	1	Low	3
Search and Display Departments	DepartmentTitle	1	Departments Table	1	Low	3
Search and Display Reports	ReportTitle	1	Reports Table	1	Low	3
					Total Query Function Points:	12

Interfaces

An interface is any process that requires working with information controlled by another program, such as querying data on an external server.

Complexity Key:					*Function Points Key:*	
RETs	DETs				Low	5
	1-19	20-50	51 or more		Average	7
1	Low	Low	Average		High	10

2-5	Low	Average	High			
6 or more	Average	High	High			

Process	DET Names	# of DETs	RET Names	# of FTRs	Resulting Complexity	# of FPs
Retrieve Data from Google Analytics	ReportTitle, StartDate, EndDate, Dimensions, Metrics, Sort, SortOrder, FilterOn, FilterEquality, FilterName, MaxResults	11	Reports	1	Low	5
					Total Interface Function Points:	5
					Total Unadjusted Function Points:	**87**

Scale Drivers

Overview

Driver	Rating	Justification
Precedentedness (PREC)	Low	The largely unprecedented rating is based on the fact that the developers have had some small experience with GUI design, writing a report results generator for Google Analytics, and an email generator, but it will be new putting everything together.
Development Flexibility (FLEX)	Very Low	The development flexibility is very low, as a rigorous adherence to the requirements must be maintained.
Architecture and Risk Resolution (RESL)	High	Many of the associated risks have already been resolved. For instance, sample programs have been written for sending the email, querying Google Analytics, and connecting to a database.
Team Cohesion (TEAM)	Nominal	Even though the team can be very cooperative at times, each developer has differing opinions, and it can be difficult to reach a resolution. For this reason, a basically cooperative rating has been selected.
Process Maturity (PMAT)	Very Low	The Process Maturity could be found using the Capability Maturity Model (CMM) Level or examining key process areas. Because this is the first time the team is doing this procedure, the CMM Level is 1 by default.

Details

Precedentedness

Feature	Rating	Justification
Organizational understanding of product objectives	Very Low	The developers have a general understanding of the objectives but not very much experience with creating software to fulfill these objectives
Experience in working with realted software systems	Nominal	Even though designing the product as a whole is largely unprecedented, the developers have a lot of related experience working with databases, email servers, and Google Analytics APIs
Concurrent development of associated new hardware and operational procedures	Extra High	There is no concurrent development of associated new hardware, so the highest rating has been selected, minimizing the impact of this feature.
Need for innovative data processing architectures and algorithms	Extra High	There is little to no need for innovative data processing architectures and algorithms, since this product provides the same sort of functionality found in other programs that integrate with databases and other servers.

Development Flexibility

Feature	Rating	Justification
Need for software conformance with pre-established requirements	Very Low	The software must comply fully with all specified requirements.
Need for software conformance with external interface specifications	Very Low	The software must comply fully with external interfaces. For instance, a user cannot specify any part of a report that is not supported by Google Analytics or the results will fail to generate.
Premium on early completion	Extra High	There is no premium on early completion, which helps loosen the rigorousness slightly.

Team Cohesion

Characteristic	Rating	Justification
Consistency of stakeholder objectives and cultures	High	Each team member has an understanding of the objectives, and so wishes to achieve the same objectives. Although, there are a few inconsistencies among team members as to how the objectives should be reached.
Ability, willingness of stakeholders to accommodate other stakeholders' objectives	High	The team can reach a compromise after some debate of the pros and cons of each idea.
Experience of stakeholders in operating as a team	Low	Each team member has a little experience with teamwork but have not worked together on any projects.
Stakeholder teambuilding to achieve shared vision and commitments	Very Low	There has been no teambuilding outside of team meetings.

Cost Drivers

Factor	Rating	Justification
		Product Factors
Required Software Reliability (RELY)	Low	A product malfunction would result in easily recoverable losses. For example, a corrupted report could be re-created.
Database Size (DATA)	Low	The amount of data being stored in the database is going to be very small, including all of the data in all the tables.
Product Complexity (CPLX)*	Low	The Product Complexity Breakdown chart below shows that the complexity for the product tends towards a lower rating.
Required Reusability (RUSE)	Nominal	There is some expected reusability between similar classes, such as Contacts and Departments. This will be used to employ reusability across the project
Documentation Match to Life-Cycle Needs (DOCU)	Nominal	The amount of documentation should be about right-sized for the life-cycle needs.
		Platform Factors
Execution Time Constraint (TIME)	Nominal	There are no major execution time constrants, and the product should have no problem executing within normal time constraints.
Main Storage Constraint (STOR)	Nominal	There are no required storage constraints, and the database is expected to be very small, regardless.

Platform Volatility (PVOL)	Low	Google Analytics is not likely to change majorly very often.
Personnel Factors		
Analyst Capability (ACAP)	Low	The analysis is being performed by the developers, so the analyst capability is certainly not high. However, in general, the team has been able to perform fairly efficient analysis and design.
Programmer Capability (PCAP)	Nominal	As a collection of student developers, the team is not as knowledgeable as professionals may be, but the team members have a lot of combined talents and knowledge which can help overcome obstacles.
Applications Experience (AEXP)	Very Low	The team has had under two months of experience developing the product.
Platform Experience (PEXP)	Low	Cumulatively, the team has a fair amount of experience with graphical user interface design, database connectivity, and other platforms.
Language and Tools Experience (LTEX)	Low	Even though the team has had years of experience with languages such as C++, there is some amount of unfamiliarity with Java and the Eclipse IDE.
Personnel Continuity (PCON)	Very High	There will be no personnel turnover during the course of the project. At least, there had better not be.
Project Factors		
Use of Software Tools (TOOL)	Low	For this project, the Eclipse IDE will be used for writing the code, the Swing Designer for creating the GUI, and some tools like JUnit will be used for testing. There is no significant integration to life-cycle management tools.
Multisite Development (SITE)	High	For any offsite development, the team can easily communicate through a variety of means: phone, text, email, and online chat systems.
Required Development Schedule (SCED)	Nominal	The development schedule is fitted to 100% of the available time.

* Product Complexity Breakdown:

Factor	Rating	Justification
Control Operations	Nominal	The program will use some message passing and intermodule control.
Computational Operations	Very Low	There are no extensive computations to be performed by the product.
Device-dependent Operations	Very Low	All of the input and output will be done using straightforward reads and writes.
Data Management Operations	Low	There is a single settings file which is expected to have no structural changes. Some of the database calls may be moderately complex.
User Interface Management Operations	Nominal	The GUI is being built using the simple Swing widget set.

Calculation Result

Using the online COCOMOII calculator at http://diana.nps.edu/~madachy/tools/COCOMOII.php:

Effort = 15.1 Person-months

This is a fair estimation. For a five person team, this is about 3 person-months of effort each.

Schedule = 9.0 Months

The online calculator returns a schedule of 9 months. However, this does not account for team sizes. Using the estimated effort from above, 3 months would also be reasonable estimate for duration.

Process	Number of DETs	FTR Names	Number of FTRs	Resulting Complexity	No. FPs		
Email Report Results	13	Reports,Departments,Tables	3	Average	5		

File	Number of DETs	Number of RETS	DET Names	Resulting Complexi	No. FPs		
Contacts	9	1	FirstName,LastName, HomePhone,WorkPhone, HomeAddress,WorkAddress, eMail,Birthday	Low	7		
Departments	3	2	Title, Phone, Address	Low	7		
Reports	8	6	Title,StartDate,EndDate,Dimension	Average	10		

Process	Number of DETs	FTR Names	Number of FTRS	Resulting Complexity	Number of FPs	
Preview Report Results	10	Reports	1	Low	3	
Search and Display Contacts List	2	Contacts	1	Low	3	
Search and Display Departments List	1	Departments	1	Low	3	
Search and Display Reports List	1	Reports	1	Low	3	

Process	Number of DETs	FTR Names	Number of FTRs	Resulting Complexity	No. FPs		
Retreive Data From Google Analytics	10	Reports	1	Low	5		
Push Email to SMTP Server	4	Reports, Departments, Contacts	3	Low	5		

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Architecture and Risk Resolution	High	Many of the associated risks have already been resolved. For instance, sample programs have been written for sending the email, querying Google Analytics, and connecting to a database.
Team Cohesion	Nominal	Even though the team can be very cooperative at times, each developer has differing opinions, and it can be difficult to reach a resolution. For this reason, a basically cooperative rating has been selected.
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