Project: ServeMe System

CSE 5325 – Spring 2022

Project Management

Module: COCOMO

Deliverable: COCOMO Estimate Report

Version: [1.0] **Date: [04/12/2022]**

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1. INTRODUCTION :-

The objective of this document is to estimate the cost, effort, and schedule for the ServeMe System (SMS).

We utilized SystemStar to compute and generate reports that we would use as a guide throughout the project. For your convenience, we've included print screens of the COCOMO.

We derived COCOMO findings by taking into account 3 critical factors :

- Source Line of Code(SLOC)
- Scale Drivers
- Cost Drivers

SIGNIFICANT ESTIMATES PRODUCED :

- Total size of SLOC
- Total Effort(in Person-Months)
- Total Duration(in Months)
- Total Cost(in thousand $)
- Total Productivity

MODEL USED: Waterfall

NUMBER OF DEVELOPERS: 5

Furthermore, the disparities between the two estimates will be analyzed, and recommendations for our project plan will be made based on the COCOMO projections. To provide context, the COCOMO II estimate for the ServeMe System project indicates a 5-month length, but the prior estimate on the Microsoft Project Plan indicated a 3-month period. The project also specifies the methods to be followed in order to eliminate cost variations and schedule inconsistencies.

2. Estimating Factors :-

2.1 SOURCE OF LINES OF CODE :-

The following is the number of lines of code delivered as part of this project, A justification for the total amount of LOC is provided.

SLOC | Source Lines of Code	Value Chosen: : **5000**
Justification: We have decided to go for the maximum SLOC i.e., 5000 so that we would be able to estimate programming productivity or maintainability once the software is developed, as well as to anticipate the amount of effort that will be necessary to construct a program.	

2.2 SCALE DRIVERS :-

The following is the list of scale drivers, the values applicable to this project and a justification for each value chosen:

PREC | Precendentedness	Value Chosen: : **Generally Familiar**
Justification: The Senior developer can lead the team, along with other team members as they are familiar with the system design of the project since they have strong technical background.	

FLEX | Development Flexibility	Value Chosen: : **Some relaxation**
Justification: We want to satisfy all our standards. Some relaxation will be provided when something unexpected occurs, such as a personal loss or a medical issue.	

RESL | Architecture/Risk Resolution	Value Chosen: : **Mostly (90%)**
Justification: Our needs will be fully stated for the duration of the project. but there can be unforeseen problems with the android version OS and web application, so we have kept it as 90%.	

TEAM | Team Cohesion	Value Chosen: : **Highly Cooperative**
Justification: We have a solid working connection with our business stakeholders. Also, our project team, strongly supports teambuilding to achieve a shared vision and commitments. All deliverables are completed on time by the team.	

PMAT | Process Maturity	Value Chosen: : **SEI CMM Level 4**
Justification: The ServeMe system is handled by highly skilled employees who are focused on a quantitative approach to analyze service and project performance to identify and implement process improvements to meet and exceed customers.	

2.3 COST DRIVERS :-

The following is a list of cost drivers, the values that apply to this project, and a reason for each value selected :

ACAP | Analyst Capability	Value Chosen: : **Very High**
Justification: It is a measure of the analyst's skill to determine how effectively the analyst understands and lays out the project's needs. This element is managed at a very high level since the team consists of professional programmers and QA engineers.	

APEX | Applications Experience Cost	Value Chosen: : **Very High**
Justification: In addition to technical skills, application experience is essential. Object technology has been used in many key commercial end-user applications that deliver business benefits.	

PCAP | COCOMO Programmer	Value Chosen: : **Very High**
Justification: The team's members are all highly qualified and well-known. Even the Junior programmer, a fresh college grad recruit, had to go through a rigorous interview procedure before being assigned to this project.	

PLEX | Platform Experience Cost	Value Chosen: : **Very High**
Justification: It is a measure of the team's experience with the platform, and because the team is familiar with the website development platform and a few new platforms to be merged into the website, this is set to Very High.	

LTEX | Language and Tool	Value Chosen: : **Very High**
Justification: Our experts have been well-versed with JavaScript, Java, React, Springboot, MySQL, HTML, CSS and our junior engineers have at least three years of expertise with Android technologies and languages.	

PCON | Personnel Continuity Cost	Value Chosen: : **High**
Justification: It is a measure of the continuity of staff with the existing organization and is expressed in terms of annual turnover. Assuming that few employees leave the company each year, this is set to High.	

PROJECT :

TOOL | COCOMO Use of Software	Value Chosen: : **Nominal**
Justification: We will make use of freely available market instruments. This is our test version of the project. To acquire clients, we want our developers to provide high-quality code. As a result, we shall limit ourselves to a minimal degree of Software tool.	

SITE | COCOMO Multisite	Value Chosen: : **Extra High**
Justification: It computes the number depending on the locations of the team members, who are spread throughout many cities. Assuming the team is in the same city, this is marked as Extra High.	

SCED | Required Development	Value Chosen: : **Very Low**
Justification: We have a strict development timetable due to our restricted time. We also prepared a Low development timetable because the project had to be finished within a certain time frame.	

PLATFORM :

TIME | Execution Time Constraint	Value Chosen: : **Nominal**
Justification: We strive to create software projects that do not consume too much of the available execution time. As a result, we have set time to nominal. It also implies that execution will not be too poor, or we will be unable to match client expectations.	

STOR | Main Storage Constraint	Value Chosen: : **High**
Justification: It is a measure of how much storage space the software will take up on the machine it is being run on. Because it is a website, it will utilize high storage on the client side, hence it is marked as High.	

PVOL | Platform Volatility Cost	Value Chosen: : **Low**
Justification: We picked a minimal platform volatility since there would be no substantial changes for a year after the project is deployed. Every month, we will concentrate on small adjustments such as aesthetic changes, new versions, license renewal, performance scalability, and so on.	

PRODUCT :

RELY | Required Software Reliability	Value Chosen: : **High**
Justification: It is a metric based on the repercussions that the customer will suffer if the software fails. If the website goes down, the client would suffer a significant financial loss, hence this is rated as high.	

DATA | Database Size Cost Driver	Value Chosen: : **Nominal**
Justification: Since we are not establishing a separate database We will utilize an off-the-shelf database, MySQL, which is freely available to us. As a result, the database will not be too huge to handle.	

CPLX | Product Complexity Cost	Value Chosen: : **High**
Justification: While developing complicated applications, UX designers and researchers should address the complexities of integration, information, objective, environment, and institution.	

RUSE | Required Reusability Cost	Value Chosen: : **High**
Justification: In terms of usability, the ServeMe System is pretty general. We are utilizing skilled personnel, as well as spending money and time, to create an application that can be re-used in our firm for future reference. This reusability element will also help us train the resources.	

DOCU | COCOMO Documentation Match to Lifecycle Needs Cost Driver	Value Chosen: : **Nominal**
Justification: : It represents the amount of documentation that will be created during the product development process. We have designated this as Nominal since we are developing the website utilizing waterfall methodology.	

3 PROJECT FINAL TIMELINE AND COST STRUCTURE :-

Time and Cost Structure from previous assignment (Microsoft Project Planner) :

TYPES	TIME AND COST
DURATION	3 months
HUMAN RESOURCE COST	$1,27,600
NON-HUMAN RESOURCES COST	$64,000
PROFIT (0.5*(HUMAN + NON-HUMAN COST))	$1,91,600*0.5 = $95,800
TOTAL COST	$1,91,600 + $95,800 = $2,87,400

Below are the New Time and Cost Structure (COCOMO) :

TYPES	TIME AND COST
DURATION	4.9 months
COCOMO ESTIMATED COSTS (HUMAN RESOURCES)	$2,57,500
NON-HUMAN RESOURCES	$64,375
MAINTENANCE COST	$17,500
PROFIT (0.5*(HUMAN + NON-HUMAN COST))	$3,39,375*0.5 = $1,69,687.5
TOTAL COST	$3,39,375 + $1,69,687.5= $5,09,062.5

4. CONCLUSION AND RECOMMENDATIONS :-

CONCLUSIONS :

In second assignment, we did not compute the project cost and schedule prediction for the project, platform, and product, we did not use any equation, we overallocated human resources for a 3-month project, we did not include maintenance cost, we miscalculated the non-human resources such as license, hardware, and utility cost and we did not know the productivity of the resources involved.

The COCOMO findings are listed below :

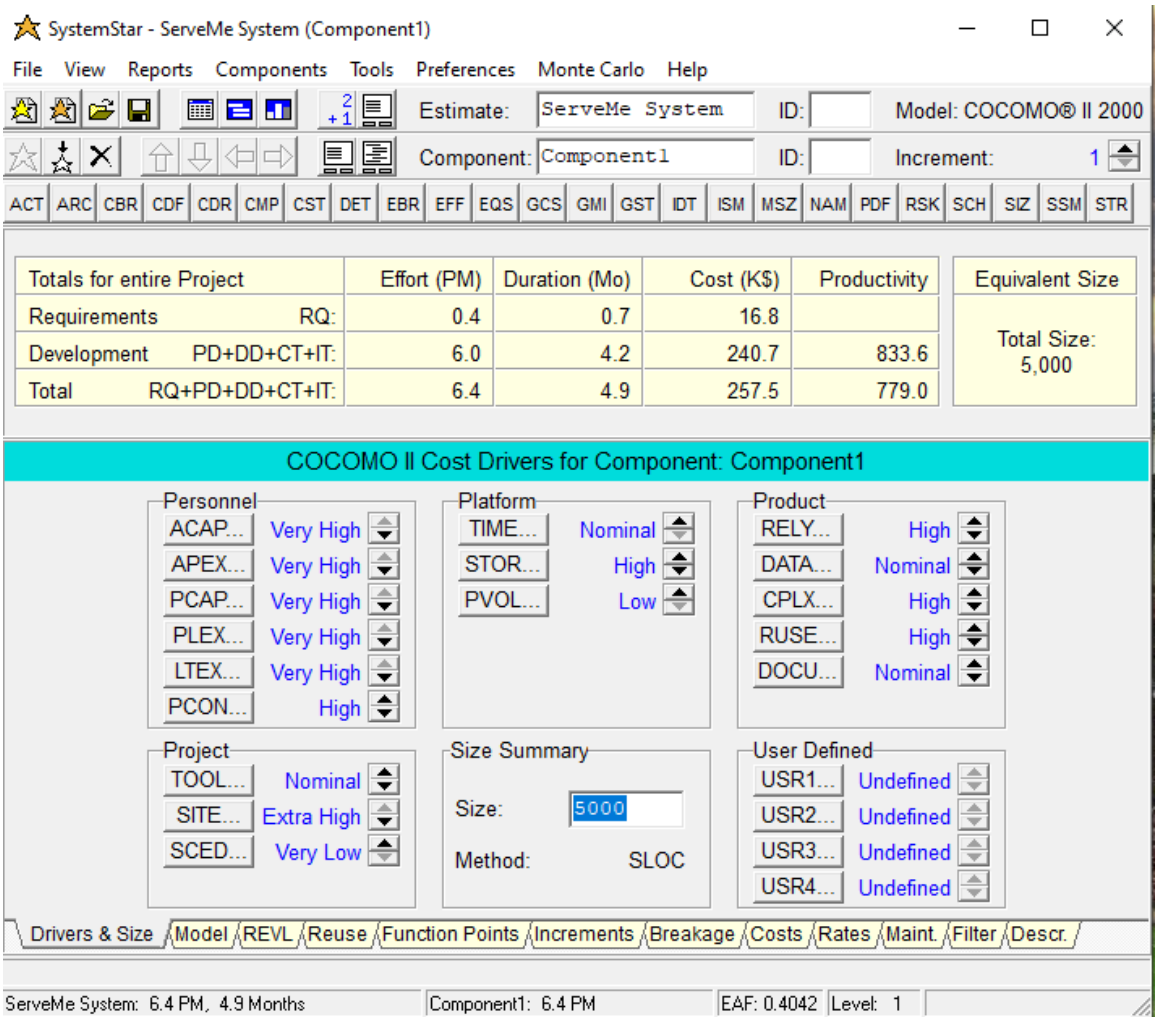
- Total size of SLOC: 5000
- Total Effort(in Person-Months): 6.4
- Total Duration(in Months): 4.9
- Total Cost(in thousand $): 257.5
- Total Productivity: 779

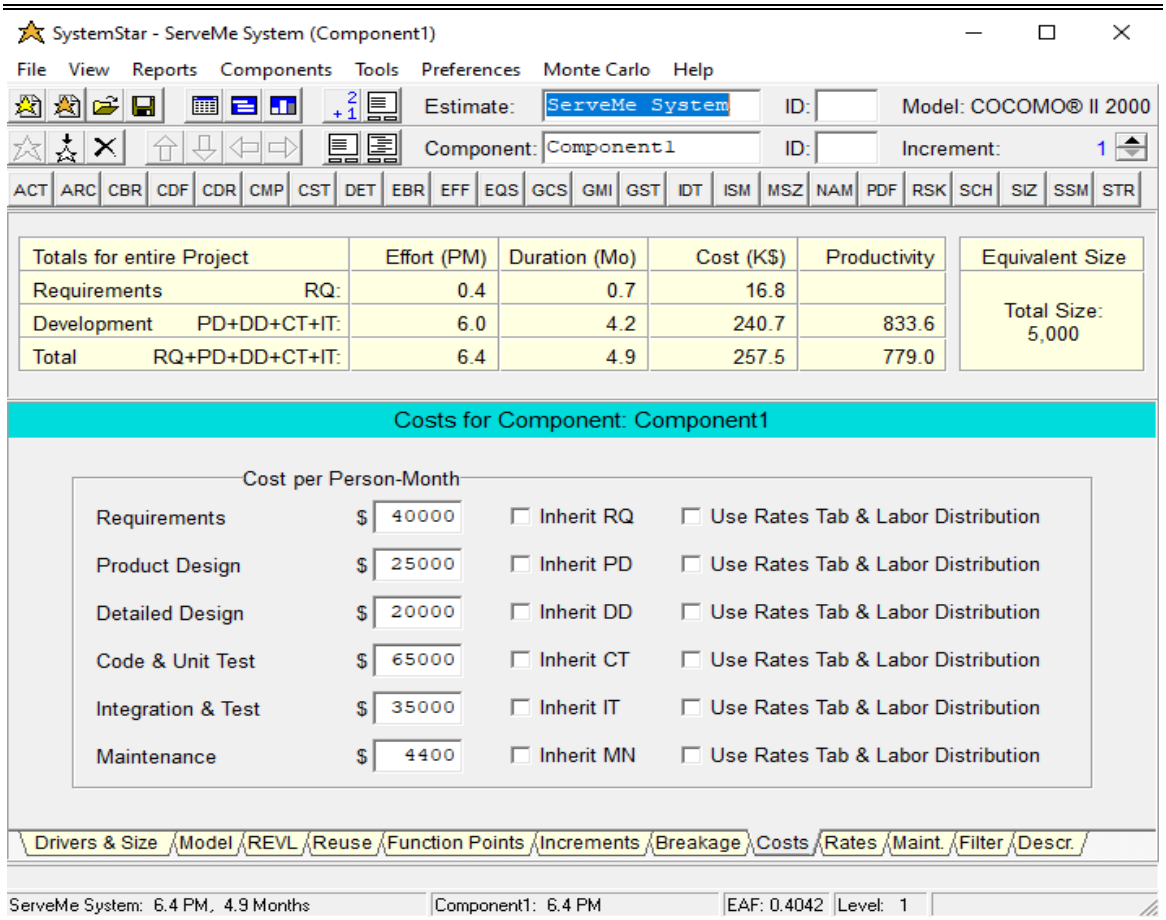
RECOMMENDATION :

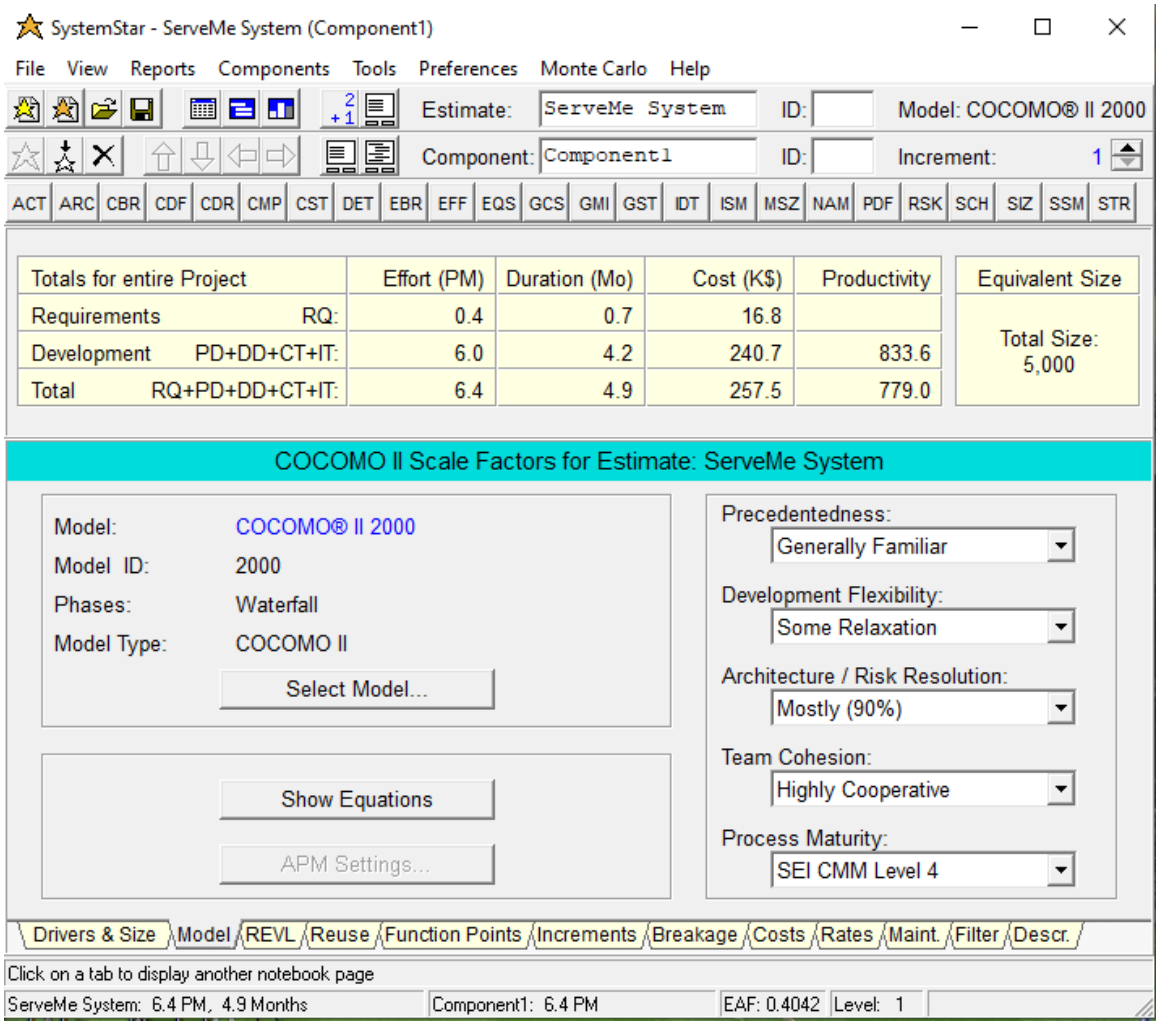
Following things are the reasons why we would use COCOMO :

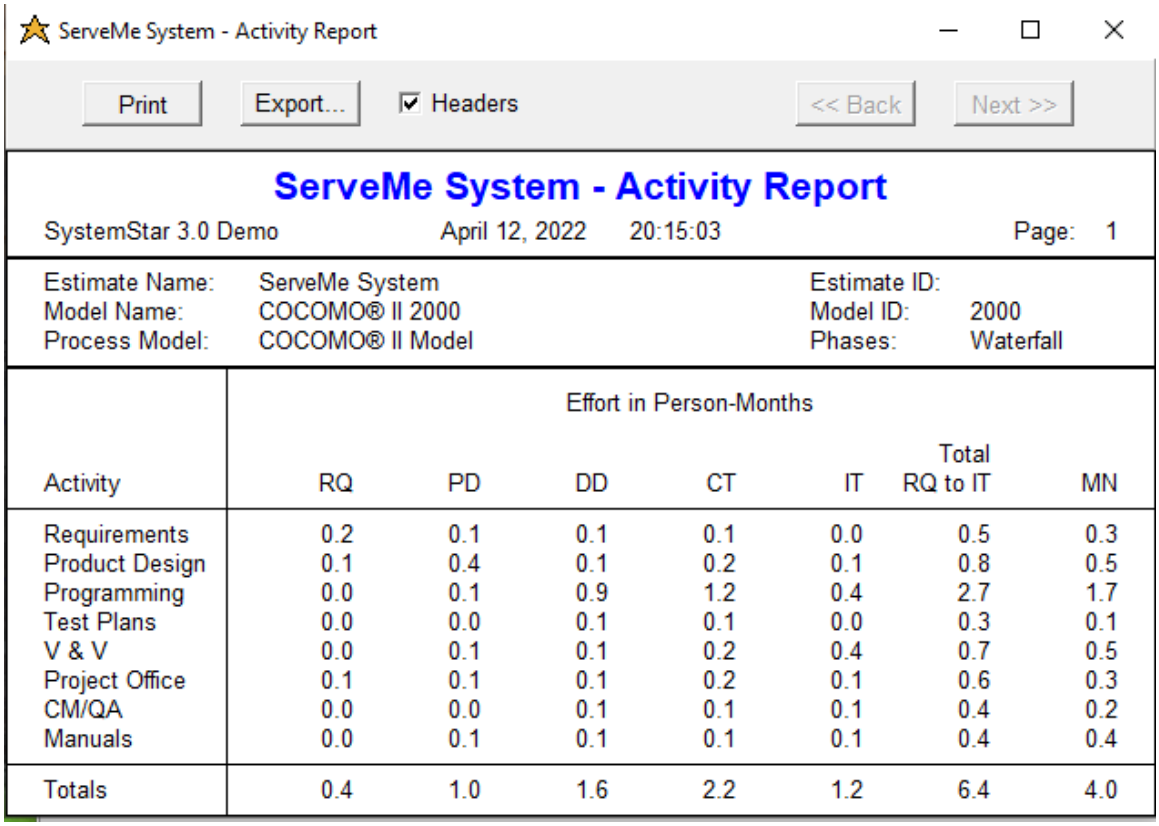
- Better management, Easy to follow, Reports and Graphs Generation.
- Due to the time constraints, it is strongly advised that we ship the primary capabilities requested by the customer in modest releases so that we may have a soft launch of the website on time. We will add the remaining functionalities when the website becomes online.
- If there is a set budget, we can solve the problem by successfully going through the application. We may bypass the mid-development phase where we need to collect input and instead proceed with full-scale feature development to complete all the features.

Appendices :-


SystemStar - ServeMe System (Component1)
File View Reports Components Tools Preferences Monte Carlo Help
Estimate: ServeMe System ID: Model: COCOMO® II 2000
Component: Component1 ID: Increment: 1
ACT ARC CBR CDF CDR CMP CST DET EBR EFF EQS GCS GMI GST IDT ISM MSZ NAM PDF RSK SCH SIZ SSM STR
Totals for entire Project | Effort (PM) | Duration (Mo) | Cost (K$) | Productivity | Equivalent Size
Requirements RQ: | 0.4 | 0.7 | 16.8 |
Development PD+DD+CT+IT: | 6.0 | 4.2 | 240.7 | 833.6 | Total Size: 5,000
Total RQ+PD+DD+CT+IT: | 6.4 | 4.9 | 257.5 | 779.0
COCOMO II Cost Drivers for Component: Component1
Personnel
ACAP... Very High
APEX... Very High
PCAP... Very High
PLEX... Very High
LTEX... Very High
PCON... High
Platform
TIME... Nominal
STOR... High
PVOL... Low
Product
RELY... High
DATA... Nominal
CPLX... High
RUSE... High
DOCU... Nominal
Project
TOOL... Nominal
SITE... Extra High
SCED... Very Low
Size Summary
Size: 5000
Method: SLOC
User Defined
USR1... Undefined
USR2... Undefined
USR3... Undefined
USR4... Undefined
Drivers & Size Model REVL Reuse Function Points Increments Breakage Costs Rates Maint. Filter Descr.
ServeMe System: 6.4 PM, 4.9 Months
Component1: 6.4 PM
EAF: 0.4042
Level: 1


SystemStar - ServeMe System (Component1)
File View Reports Components Tools Preferences Monte Carlo Help
Estimate: ServeMe System ID: Model: COCOMO® II 2000
Component: Component1 ID: Increment: 1
ACT ARC CBR CDF CDR CMP CST DET EBR EFF EQS GCS GMI GST IDT ISM MSZ NAM PDF RSK SCH SIZ SSM STR
Totals for entire Project | Effort (PM) | Duration (Mo) | Cost (K$) | Productivity | Equivalent Size
Requirements RQ: | 0.4 | 0.7 | 16.8 |
Development PD+DD+CT+IT: | 6.0 | 4.2 | 240.7 | 833.6 | Total Size: 5,000
Total RQ+PD+DD+CT+IT: | 6.4 | 4.9 | 257.5 | 779.0
Costs for Component: Component1
Cost per Person-Month
Requirements $ 40000 Inherit RQ Use Rates Tab & Labor Distribution
Product Design $ 25000 Inherit PD Use Rates Tab & Labor Distribution
Detailed Design $ 20000 Inherit DD Use Rates Tab & Labor Distribution
Code & Unit Test $ 65000 Inherit CT Use Rates Tab & Labor Distribution
Integration & Test $ 35000 Inherit IT Use Rates Tab & Labor Distribution
Maintenance $ 4400 Inherit MN Use Rates Tab & Labor Distribution
Drivers & Size Model REVL Reuse Function Points Increments Breakage Costs Rates Maint. Filter Descr.
ServeMe System: 6.4 PM, 4.9 Months
Component1: 6.4 PM
EAF: 0.4042
Level: 1


SystemStar - ServeMe System (Component1)
File View Reports Components Tools Preferences Monte Carlo Help
Estimate: ServeMe System ID: Model: COCOMO® II 2000
Component: Component1 ID: Increment: 1
ACT ARC CBR CDF CDR CMP CST DET EBR EFF EQS GCS GMI GST IDT ISM MSZ NAM PDF RSK SCH SIZ SSM STR
Totals for entire Project | Effort (PM) | Duration (Mo) | Cost (K$) | Productivity
Requirements RQ: | 0.4 | 0.7 | 16.8 |
Development PD+DD+CT+IT: | 6.0 | 4.2 | 240.7 | 833.6
Total RQ+PD+DD+CT+IT: | 6.4 | 4.9 | 257.5 | 779.0
Equivalent Size
Total Size: 5,000
COCOMO II Scale Factors for Estimate: ServeMe System
Model: COCOMO® II 2000
Model ID: 2000
Phases: Waterfall
Model Type: COCOMO II
Select Model...
Show Equations
APM Settings...
Precedentedness: Generally Familiar
Development Flexibility: Some Relaxation
Architecture / Risk Resolution: Mostly (90%)
Team Cohesion: Highly Cooperative
Process Maturity: SEI CMM Level 4
Drivers & Size Model REVL Reuse Function Points Increments Breakage Costs Rates Maint. Filter Descr.
Click on a tab to display another notebook page
ServeMe System: 6.4 PM, 4.9 Months
Component1: 6.4 PM
EAF: 0.4042
Level: 1



ServeMe System - Activity Report

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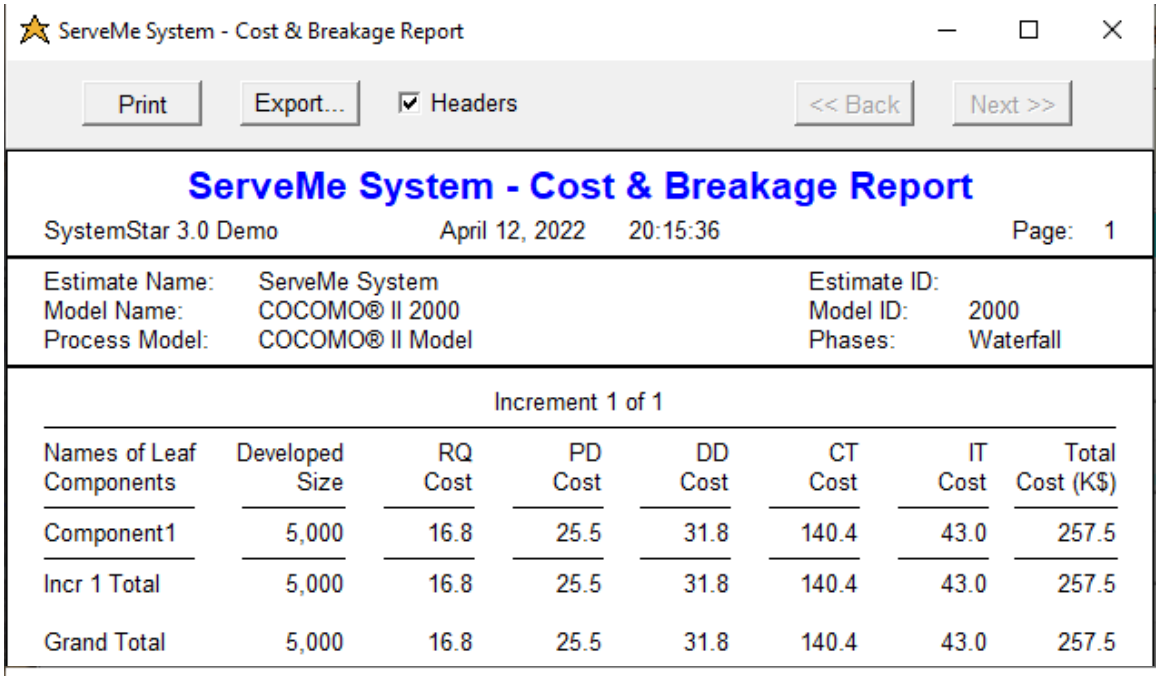
Estimate Name:	ServeMe System	Estimate ID:	
Model Name:	COCOMO® II 2000	Model ID:	2000
Process Model:	COCOMO® II Model	Phases:	Waterfall

	Effort in Person-Months						
Activity	RQ	PD	DD	CT	IT	Total RQ to IT	MN
Requirements	0.2	0.1	0.1	0.1	0.0	0.5	0.3
Product Design	0.1	0.4	0.1	0.2	0.1	0.8	0.5
Programming	0.0	0.1	0.9	1.2	0.4	2.7	1.7
Test Plans	0.0	0.0	0.1	0.1	0.0	0.3	0.1
V & V	0.0	0.1	0.1	0.2	0.4	0.7	0.5
Project Office	0.1	0.1	0.1	0.2	0.1	0.6	0.3
CM/QA	0.0	0.0	0.1	0.1	0.1	0.4	0.2
Manuals	0.0	0.1	0.1	0.1	0.1	0.4	0.4
Totals	0.4	1.0	1.6	2.2	1.2	6.4	4.0


ServeMe System - Cost & Breakage Report
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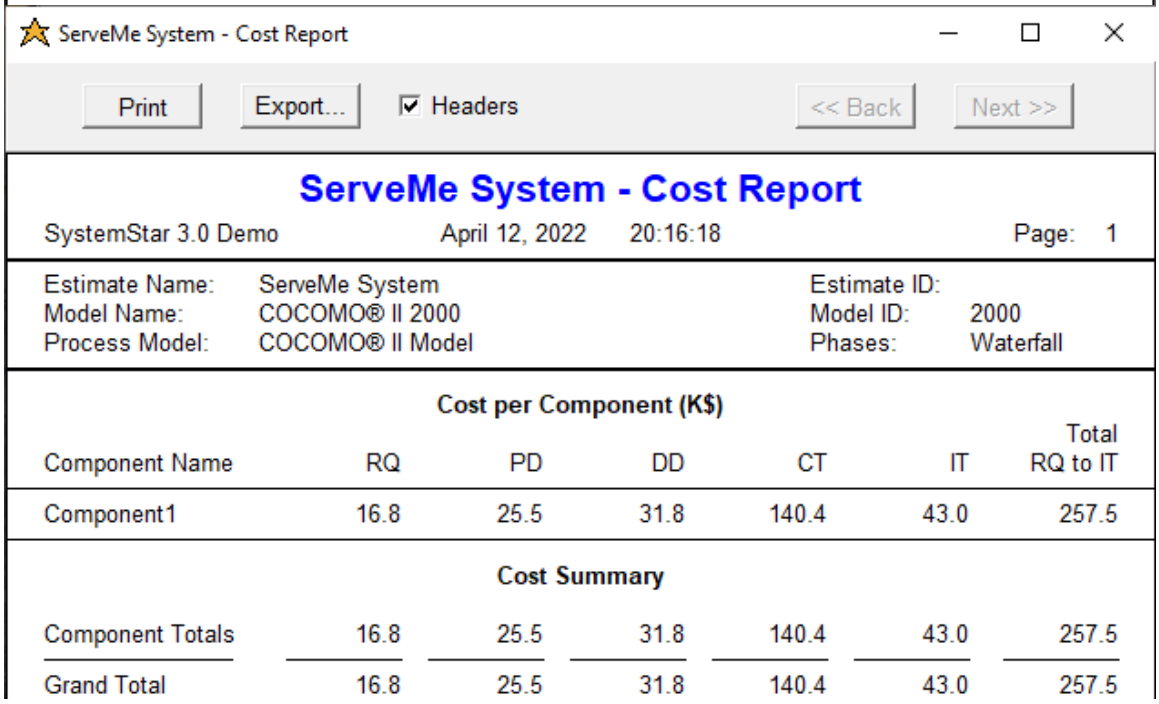
ServeMe System - Cost & Breakage Report
SystemStar 3.0 Demo
April 12, 2022
20:15:36
Page: 1
Estimate Name: ServeMe System
Model Name: COCOMO® II 2000
Process Model: COCOMO® II Model
Estimate ID:
Model ID: 2000
Phases: Waterfall
Increment 1 of 1
Names of Leaf Components
Developed Size
RQ Cost
PD Cost
DD Cost
CT Cost
IT Cost
Total Cost (K$)
Component1 5,000 16.8 25.5 31.8 140.4 43.0 257.5
Incr 1 Total 5,000 16.8 25.5 31.8 140.4 43.0 257.5
Grand Total 5,000 16.8 25.5 31.8 140.4 43.0 257.5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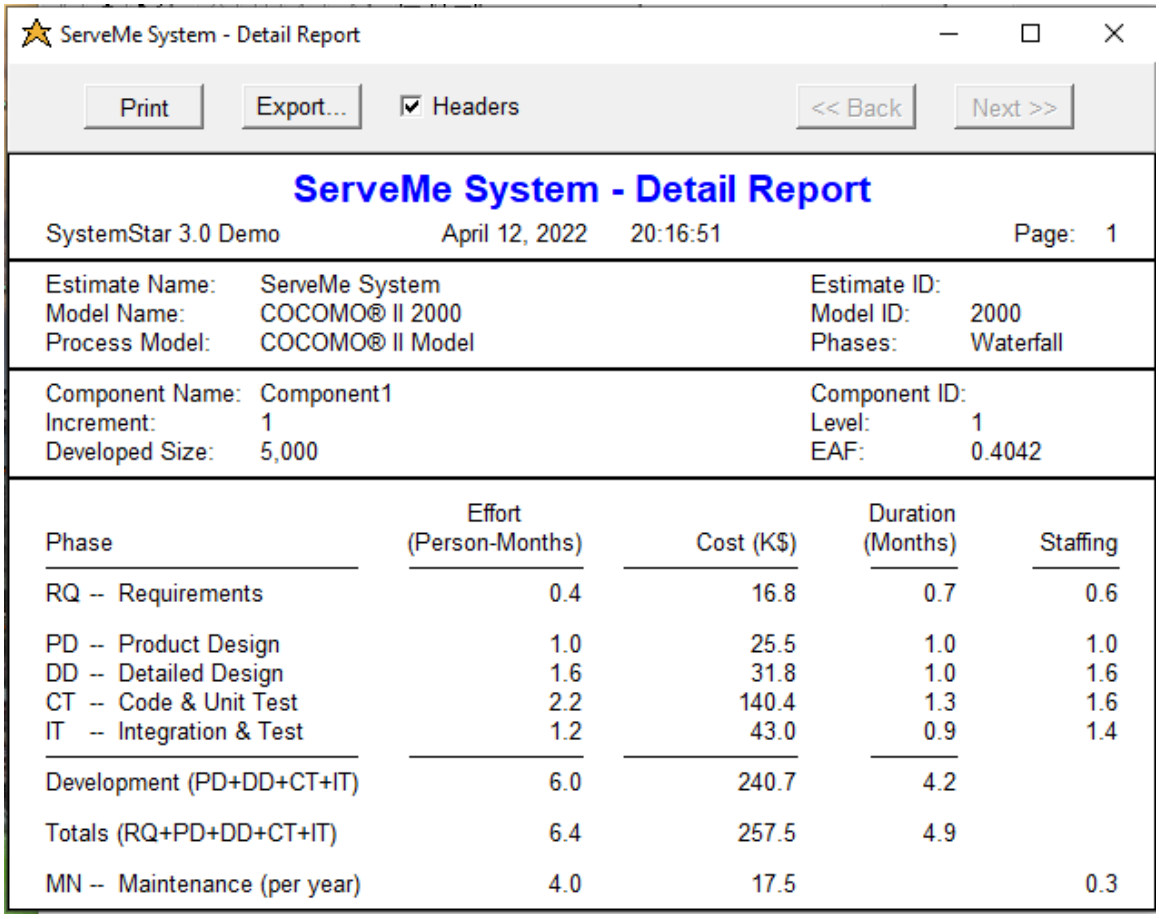
ServeMe System - Cost Report
SystemStar 3.0 Demo
April 12, 2022
20:16:18
Page: 1
Estimate Name: ServeMe System
Model Name: COCOMO® II 2000
Process Model: COCOMO® II Model
Estimate ID:
Model ID: 2000
Phases: Waterfall
Cost per Component (K$)
Component Name
RQ
PD
DD
CT
IT
Total RQ to IT
Component1 16.8 25.5 31.8 140.4 43.0 257.5
Cost Summary
Component Totals 16.8 25.5 31.8 140.4 43.0 257.5
Grand Total 16.8 25.5 31.8 140.4 43.0 257.5



ServeMe System - Detail Report

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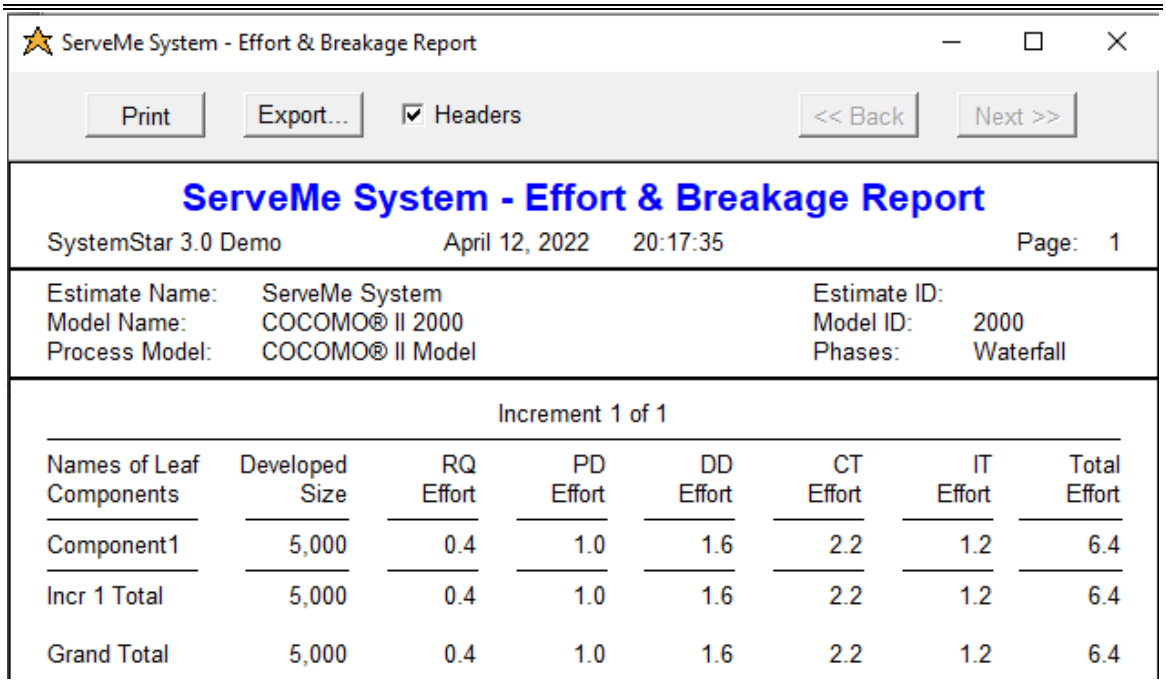
Estimate Name:	ServeMe System	Estimate ID:	
Model Name:	COCOMO® II 2000	Model ID:	2000
Process Model:	COCOMO® II Model	Phases:	Waterfall

Component Name:	Component1	Component ID:	
Increment:	1	Level:	1
Developed Size:	5,000	EAF:	0.4042

Phase	Effort (Person-Months)	Cost (K$)	Duration (Months)	Staffing
RQ -- Requirements	0.4	16.8	0.7	0.6
PD -- Product Design	1.0	25.5	1.0	1.0
DD -- Detailed Design	1.6	31.8	1.0	1.6
CT -- Code & Unit Test	2.2	140.4	1.3	1.6
IT -- Integration & Test	1.2	43.0	0.9	1.4
Development (PD+DD+CT+IT)	6.0	240.7	4.2	
Totals (RQ+PD+DD+CT+IT)	6.4	257.5	4.9	
MN -- Maintenance (per year)	4.0	17.5		0.3



ServeMe System - Effort & Breakage Report

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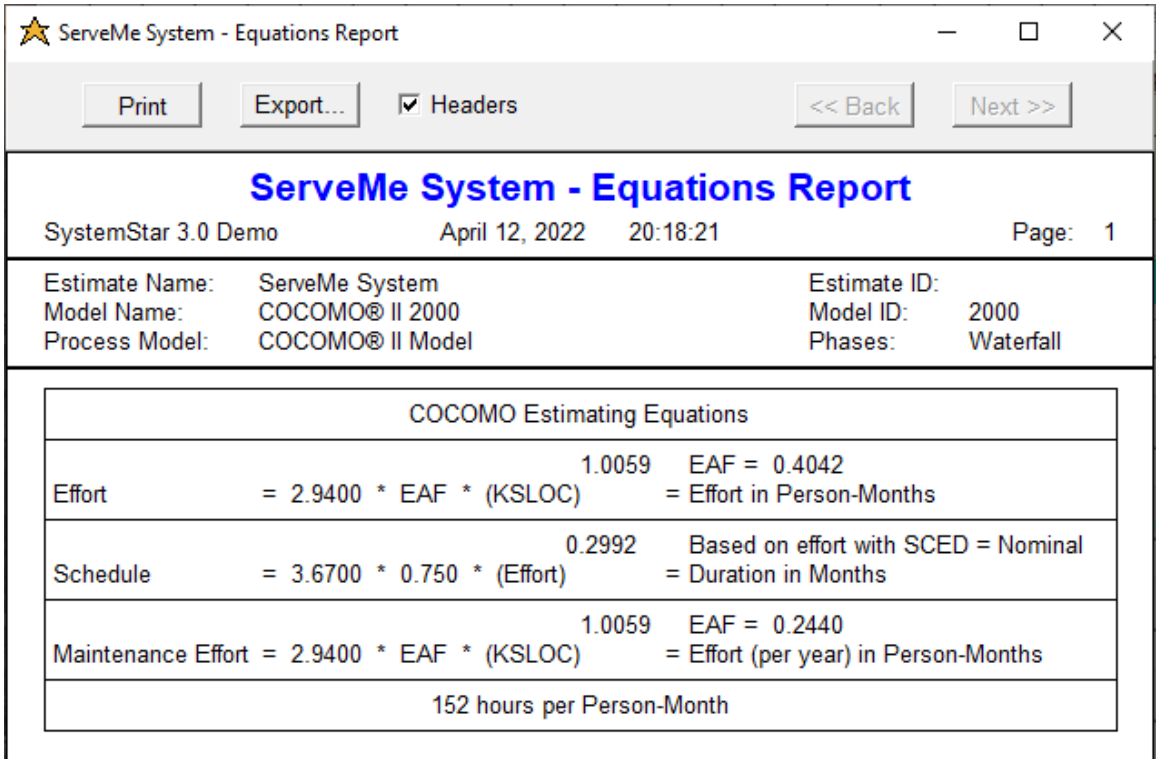
Estimate Name:	ServeMe System	Estimate ID:	
Model Name:	COCOMO® II 2000	Model ID:	2000
Process Model:	COCOMO® II Model	Phases:	Waterfall

Increment 1 of 1

Names of Leaf Components	Developed Size	RQ Effort	PD Effort	DD Effort	CT Effort	IT Effort	Total Effort
Component1	5,000	0.4	1.0	1.6	2.2	1.2	6.4
Incr 1 Total	5,000	0.4	1.0	1.6	2.2	1.2	6.4
Grand Total	5,000	0.4	1.0	1.6	2.2	1.2	6.4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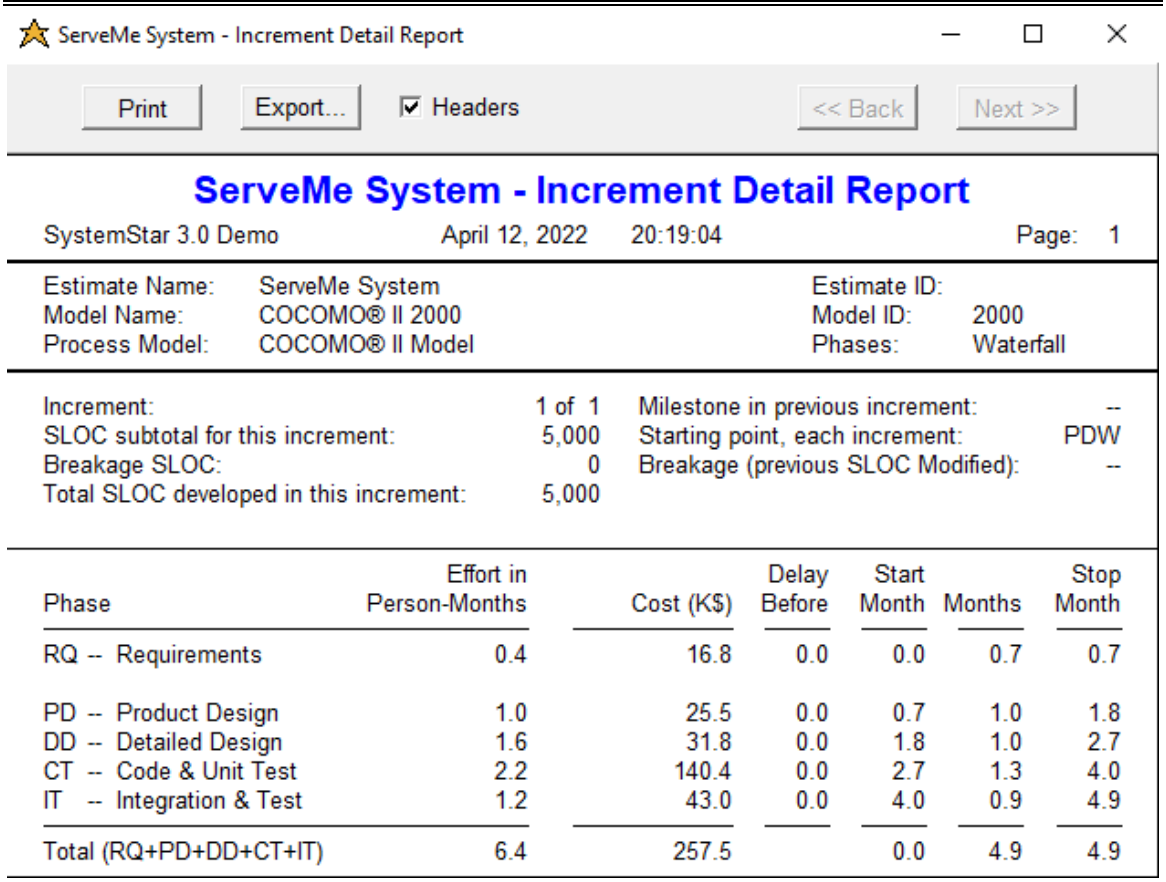
ServeMe System - Equations Report
SystemStar 3.0 Demo April 12, 2022 20:18:21 Page: 1
Estimate Name: ServeMe System
Model Name: COCOMO® II 2000
Process Model: COCOMO® II Model
Estimate ID:
Model ID: 2000
Phases: Waterfall
COCOMO Estimating Equations
Effort = 2.9400 * EAF * (KSLOC) 1.0059 EAF = 0.4042 = Effort in Person-Months
Schedule = 3.6700 * 0.750 * (Effort) 0.2992 Based on effort with SCED = Nominal = Duration in Months
Maintenance Effort = 2.9400 * EAF * (KSLOC) 1.0059 EAF = 0.2440 = Effort (per year) in Person-Months
152 hours per Person-Month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ServeMe System - Increment Detail Report
SystemStar 3.0 Demo April 12, 2022 20:19:04 Page: 1
Estimate Name: ServeMe System
Model Name: COCOMO® II 2000
Process Model: COCOMO® II Model
Estimate ID:
Model ID: 2000
Phases: Waterfall
Increment: 1 of 1
SLOC subtotal for this increment: 5,000
Breakage SLOC: 0
Total SLOC developed in this increment: 5,000
Milestone in previous increment: --
Starting point, each increment: PDW
Breakage (previous SLOC Modified): --
Phase | Effort in Person-Months | Cost (K$) | Delay Before | Start Month | Months | Stop Month
RQ -- Requirements 0.4 16.8 0.0 0.0 0.7 0.7
PD -- Product Design 1.0 25.5 0.0 0.7 1.0 1.8
DD -- Detailed Design 1.6 31.8 0.0 1.8 1.0 2.7
CT -- Code & Unit Test 2.2 140.4 0.0 2.7 1.3 4.0
IT -- Integration & Test 1.2 43.0 0.0 4.0 0.9 4.9
Total (RQ+PD+DD+CT+IT) 6.4 257.5 0.0 4.9 4.9