



Project Report
School of Information Technology
and Engineering

M.Tech Software Engineering

Software Project Management (SWE 2006)

J Component - Review I

Title : Online Job Portal

Tool : System Star Tool

Submitted by :

A. Pooja 18M1S0232

K. Sai Lavanya 18M1S0243

A. Poojitha 18M1S0257

Faculty : Prof. R. Sujatha

Slot : Aa + TAA

Introduction:-

This project is aimed at developing an online search portal for the placement details for job seekers. The system is an online application that can be accessed through out the organization and outside as well with proper login provided. This system can be used as an online job portal for job seekers. Job seekers should be able to upload their information in the form of a cv. visitors or company representatives logging in may also access or search any information put up by job aspirants.

A single overall project authority need to be established so that there is unity of purpose among all those concerned.

The online job portal system is a platform between the job seeker and job provider. The student or job seeker can easily find and apply for job by login into system. The employer or company can easily get expert employee from the job portal site by posting a job. The job portal website is a common place between job seeker and company.

When the job seeker can login in his account then he can get notification of company lists which match his profile or education detail. So job seeker can easily apply to this job and he can also send message to company for other enquiry. If any problem arises it is left to the user representatives on the board to resolve those differences and to present an agreed policy to the system developers.

Abstract :-

In this competitive era, the education among the people is so increasing that the jobs for them are now decreasing. Even the companies want the people who are best in their fields. At that time, it becomes difficult to find the people who are intelligent enough to be hired. The work for the companies also increases to find the people who can fulfill their requirements. Thinking about these problems, one can think about the process which can handle this process and make the work less complex.

The project is about the recruitment process which is done online. The recruitment process here is handled by the system. This project will allow the person to apply for a job in the company for the interested Vacancy which would be available at the company. The person will be having the account after registration and will be then called applied user. If he would be qualified, he would be interacting with the system for the update.

The project is created for fulfilling the requests of the company managers so that the recruitment module can be placed in the company's website and the users who visit the website can view the vacancies in the company and will be able to apply directly from remote place even. The vacancies will be posted by the administrators on the basis of needs of manpower in the company.

The admin will have all rights of handling this process except the evaluation process as it is the company specific and so the steps of the evaluation process cannot be predicted. It also includes the layers at the admin side so the privileges will have great impact on the functionalities given to the different levels of admin. The privileges will be user specific, so different admin even at same level will have different privileges and so different functionalities. The higher level domain will handle whole system by himself. Although the lower level admin is such given privileges that he can send any kind of request to the higher level admin. The higher level admin can approve or disapprove the request. Whatever the result of the request approval, the notification will be sent to the lower level admin.

This project plays main role at admin side for recruitment process. The start dates and end dates for application's acceptance, the grace period, the job vacancies postings, modifying the privileges etc, are the special features of this system.

Case Study for Online Job Portal

In our project we have clearly mentioned about the tool features and the description of the tool chosen. To illustrate and work on the features provided by SystemStar Demo tool we have chosen an ONLINE JOB PORTAL. In nominal job portal we need to write down the data and the information about the work we perform whereas here here in this Online Job portal we can get the better way of Improvised Job portal, that all the data and the information can be stored and has an improved version too indeed. In this Online job portal we may require many modules which may also include modules which consists of various steps like logging in, having an account, entering the career and postal details of the employee.

Online job portal is a web application which gives the candidates ability to register to application and to have a perfect search for jobs and also for managing the records. The employees who want to register for the jobs can also do this function in the portal and create an account in this portal and the candidates who wish to publish job can also do this function in the portal itself.

This can be easily explained as the personal details which includes the person's career details and the category details. The main purpose of this application is to provide the job portal which works online for all the job seekers to submit their resume or CV and apply for the jobs i.e., the vacant positions for some particular domain of interest where that particular applied company employer can select the suitable employees i.e., candidates from the available job profiles applied. The whole cost required for the implementation of the Online job portal project is detected and calculated using the System Star Tool. We therefore can perform the cost benefit analysis for the online job portal system project that is used for job seekers to apply for job posts online using the SYSTEM STAR TOOL.

Introduction to Systemstar :-

- Systemstar implements two types of system models:
 1. COCOMO - Software Cost Estimation
 2. COSYSMO - Systems Engineering cost Estimation.
- Systemstar is a cost estimation tool based on the Constructive cost Model (COCOMO) created by Dr. Barry Boehm and the Constructive Systems Engineering Model (COSYSMO) created by Dr. Ricardo Valerdi.
- Engineers use Systemstar to produce estimates of a Project's cost.
- Systemstar lets you make trade-offs and experiment with "what-if" analysis to arrive at a satisfactory Project plan.

COCOMO :-

- COCOMO is the world's most widely used software estimation model.
- Software project managers use Systemstar to produce estimates of a project's duration, staffing levels, effort and cost.
- Systemstar supports the traditional COCOMO, and the most recent models:
 - Traditional COCOMO 81
 - Incremental COCOMO
 - REVIC
 - User defined COCOMO
 - COCOMO II

- COSYSMO :-
- Systemstar supports the original COSYSMO model and the latest COSYSMO 8.0 model.
- COSYSMO is described in Dr. Valerdi's dissertation "The Constructive Systems Engineering Cost Model (COSYSMO)" which is installed with the Systemstar demo.

Features of Systemstar :-

1. Support for the latest 32 bit and 64 bit windows operating systems:
Windows 7, Windows 8, and Windows 10.
2. Full support for COSYSMO 8.0 and COCOMO II models.
3. Monte Carlo Sizing - model your project by estimating a range of sizes.
4. Estimate and plan your systems engineering work.
5. ISO 15288 framework.
6. Three built-in estimating models.
7. 18 reports and graphs.
8. User-definable phases and user-definable activities.
9. Exports to Excel.
10. Supports what-if analyses and trade-off studies.
11. Supports windows XP, windows 7, windows 8, windows 10.
12. Calibration tool included (tunes the model to environment).
13. The new COSYSMO Reuse Model.

REVIEW -2

SOFTWARE PROJECT MANAGEMENT SWE2006

TOOL:- SYSTEM STAR TOOL

TOPIC:- ONLINE JOB PORTAL

FACULTY:- PROF R.SUJATHA

SLOT:A2

TEAM MEMBERS:

18MIS0232-A POOJA

18MIS0243-K SAI LAVANYA

18MIS0257-A POOJITHA

TOOL USED :- SYSTEM STAR TOOL

FEATURES OF THE TOOL:-

COCOMO is the world's most widely used software estimation model. Software project managers use SystemStar to produce estimates of a project's duration, staffing levels, effort, and cost. SystemStar lets you make trade-offs and experiment with "what-if" analyses to arrive at the optimal project plan. COCOMO is described by Barry Boehm in his books Software Engineering Economics and Software Cost Estimation with COCOMO II. COCOMO has continued to evolve and improve since its introduction. Read a brief history of COCOMO for a summary. SystemStar supports the traditional COCOMO, and the most recent models:

- Traditional COCOMO 81
- Incremental COCOMO
- REVIC
- User defined COCOMO
- COCOMO II

COCOMO II is tuned to modern software life cycles. The original COCOMO model has been very successful, but it doesn't apply to newer software development practices as well as it does to traditional practices. COCOMO II targets modern software projects, and will continue to evolve over the next few years.

COCOMO II is really three different models:-

- The Application Composition Model

Suitable for projects built with modern GUI-builder tools. Based on new Object Points.

➤ The Early Design Model

You can use this model to get rough estimates of a project's cost and duration before you've determined its entire architecture. It uses a small set of new Cost Drivers, and new estimating equations. Based on Unadjusted Function Points or KSLOC.

➤ The Post-Architecture Model

This is the most detailed COCOMO II model. You'll use it after you've developed your project's overall architecture. It has new cost drivers, new line counting rules, and new equations.

Dr. Barry Boehm and his students are developing COCOMO II at USC. We support COCOMO II in SystemStar.

MODULES:-

1. LOGIN
2. PROVIDING THE DETAILS
3. SEARCHING FOR THE PORTAL
4. ESTIMATIONS
5. LOGOUT

INPUTS FOR CASE STUDY:

- There are various inputs that we can give through tool are size, model, reuse percentage, function points ,breakage, costs, rates ,maintenance percentage,..

Size –1600

Model –Waterfall model

SCREENSHOTS OF SOME OUTPUTS:-

1.DRIVERS AND SIZE:-

SystemStar - Online job portal (Component1)

File View Reports Components Tools Preferences Monte Carlo Help

Estimate: Online job porta 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:	0.3	1.4	0.7		Total Size: 1,600
Development	PD+DD+CT+IT:	3.8	9.0	7.1	2.772	
Total	RQ+PD+DD+CT+IT:	4.1	10.4	7.7	2.591	

COCOMO II Cost Drivers for Component Component1

Personnel	Platform	Product
ACAP... Very High	TIME... Very High	RELY... Very High
APEX... High	STOR... High	DATA... High
PCAP... Very High	PVOL... Very High	CPLX... High
PLEX... High		RUSE... High
LTEX... Very High		DOCU... High
PCON... High		

Project	Size Summary	User Defined
TOOL... Very High	Size: 1600	USR1... Undefined
SITE... Very High		USR2... Undefined
SCED... Very High		USR3... Undefined
		USR4... Undefined

Method: Function Points

\ Drivers & Size Model REVL Reuse Function Points Increments Breakage Costs Rates Maint Filter Descr.

The Automatic Estimation panel displays the results for the overall estimate

2.MODEL:-

SystemStar - Online job portal (Component1)

File View Reports Components Tools Preferences Monte Carlo Help

Estimate: Online job portal 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:	0.3	1.4	0.7		Total Size: 1,600
Development	PD+DD+CT+IT:	3.8	9.0	7.1	2.772	
Total	RQ+PD+DD+CT+IT:	4.1	10.4	7.7	2.591	

COCOMO II Scale Factors for Estimate Online job portal

Model: COCOMO® II 2000	Precededness: Somewhat Unprecedented
Model ID: 2000	Development Flexibility: Some Relaxation
Phases: Waterfall	Architecture / Risk Resolution: Often (60%)
Model Type: COCOMO II	Team Cohesion: Basically Cooperative
Select Model...	Process Maturity: SEI CMM Level 2

Show Equations
APM Settings...

\ Drivers & Size Model REVL Reuse Function Points Increments Breakage Costs Rates Maint Filter Descr.

The Automatic Estimation panel displays the results for the overall estimate

3.FUNCTIONAL POINTS:-

SystemStar - Online job portal (Component1)

File View Reports Components Tools Preferences Monte Carlo Help

Estimate: Online job porta ID: Model: COCOMO® II 2000

Component: Component1 ID: Increment: 1

ACT ARC CBR CDF CDR CMP CST DET EBR EFF EOS GCS GMI GST IDT ISM MSZ NAM POF RSK SCH SIZ SSM STR

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements	RQ:	0.3	1.4	0.7		
Development	PD+DD+CT+IT:	3.8	9.0	7.1	2.772	
Total	RQ+PD+DD+CT+IT:	4.1	10.4	7.7	2.591	Total Size: 1,600

Function Point Settings for Component: Component1

	Simple	Average	Complex
External Input EI	1	0	1
External Output EO	0	0	0
Logical Internal File ILF	0	0	0
External Interface File EIF	0	1	0
External Inquiry EQ	0	0	0

UnAdjusted Function Points: 16

Adjusted Function Points: 16 Change FP Adjustment Factor...

Lines per Function Point: 100 Change Lines per Function Point...

Size before REVL: 1,600

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint / Filter / Descr.

The Automatic Estimation panel displays the results for the overall estimate

4.INCREMENTS:-

SystemStar - Online job portal (Component1)

File View Reports Components Tools Preferences Monte Carlo Help

Estimate: Online job porta ID: Model: COCOMO® II 2000

Component: Component1 ID: Increment: 1

ACT ARC CBR CDF CDR CMP CST DET EBR EFF EOS GCS GMI GST IDT ISM MSZ NAM POF RSK SCH SIZ SSM STR

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements	RQ:	0.3	1.4	0.7		
Development	PD+DD+CT+IT:	3.8	9.0	7.1	2.772	
Total	RQ+PD+DD+CT+IT:	4.1	10.4	7.7	2.591	Total Size: 1,600

Incremental Settings for Estimate: Online job portal

1	0.0	0.0	0.0	0.0	0.0
RQ	PD	DD	CT	IT	
2	0.0	0.0	0.0	0.0	
PD	DD	CT	IT		
3	0.0	0.0	0.0	0.0	
PD	DD	CT	IT		
4	0.0	0.0	0.0	0.0	
PD	DD	CT	IT		
5	0.0	0.0	0.0	0.0	
PD	DD	CT	IT		
6	0.0	0.0	0.0	0.0	
PD	DD	CT	IT		
7	0.0	0.0	0.0		
PD	DD	CT			

Start Point
 SDR
 SSR
 PDW
 PDR

Reset

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint / Filter / Descr.

The Automatic Estimation panel displays the results for the overall estimate

5.BREAKAGE:-

Increment Breakage for Estimate: Online job portal

Increment	Percent Breakage
2	2
3	2
4	1
5	1
6	1
7	2
8	3
9	4
10	5
11	4

6.COSTS:-

Online job portal - Activity Report

Activity	Effort in Person-Months						
	RQ	PD	DD	CT	IT	Total RQ to IT	MN
Requirements	0.1	0.1	0.0	0.1	0.0	0.3	0.0
Product Design	0.0	0.3	0.1	0.1	0.0	0.5	0.0
Programming	0.0	0.1	0.6	0.8	0.2	1.7	0.0
Test Plans	0.0	0.0	0.0	0.1	0.0	0.2	0.0
V & V	0.0	0.0	0.1	0.1	0.2	0.5	0.0
Project Office	0.0	0.1	0.1	0.1	0.1	0.4	0.0
CM/QA	0.0	0.0	0.1	0.1	0.1	0.3	0.0
Manuals	0.0	0.1	0.1	0.1	0.1	0.3	0.0
Totals	0.3	0.6	1.0	1.4	0.7	4.1	0.0

7.RATES:-

SystemStar - Online job portal (Component1)

File View Reports Components Tools Preferences Monte Carlo Help

Estimate: Online job porta ID: Model: COCOMO® II 2000

Component: Component1 ID: Increment: 1

ACT	ARC	CBR	CDF	CDR	CMP	CST	DET	EBR	EFF	EOS	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:	0.3	1.4	0.7		
Development PD+DD+CT+IT:	3.8	9.0	7.1	2.772	
Total RQ+PD+DD+CT+IT:	4.1	10.4	7.7	2.591	Total Size: 1,600

Costs for Component: Component1

Cost per Person-Month

Requirements	\$ 2500	<input type="checkbox"/> Inherit RQ	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Product Design	\$ 1500	<input type="checkbox"/> Inherit PD	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Detailed Design	\$ 2500	<input type="checkbox"/> Inherit DD	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Code & Unit Test	\$ 1700	<input type="checkbox"/> Inherit CT	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Integration & Test	\$ 1600	<input type="checkbox"/> Inherit IT	<input type="checkbox"/> Use Rates Tab & Labor Distribution
Maintenance	\$ 1700	<input type="checkbox"/> Inherit MN	<input type="checkbox"/> Use Rates Tab & Labor Distribution

[Drivers & Size](#) [Model](#) [REVL](#) [Reuse](#) [Function Points](#) [Increments](#) [Breakage](#) [Costs](#) [Rates](#) [Maint.](#) [Filter](#) [Descr.](#)

The Automatic Estimation panel displays the results for the overall estimate



School of Information Technology and Engineering [SITE]

M.Tech(SE) Fall Semester 2020-2021

SWE2006

Software Project Management

REVIEW - 3

Submitted By

A. Pooja 18MIS0232

K. Sai Lavanya 18MIS0243

A. Poojitha 18MIS0257

Faculty: Prof. Sujatha. R

Slot: A2

Topic: Online Job Portal

Tool used: System Star Demo

SYSTEM STAR

SystemStar is an estimation tool based on the Constructive Cost Model (COCOMO) described by Barry Boehm in his books *Software Engineering Economics* and *Software Cost Estimation with COCOMO II*, and the Constructive Systems Engineering Model (COSYSMO) described by Ricardo Valerdi and Jared Fortune.

SystemStar includes 10 different estimation models, in 3 categories:

- | | |
|-----------|---------------------|
| COCOMO 81 | Software projects |
| COCOMO II | Software projects |
| COSYSMO | Systems Engineering |

Project managers use SystemStar to produce estimates of a project's duration, staffing levels, effort, and cost. SystemStar lets you make trade-offs and experiment with "what-if" analyses to arrive at the optimal project plan.

Costar 7.0 has been superseded by SystemStar 3.0 -- SystemStar supports both the COCOMO models and the COSYSMO models.

Features:

	SystemStar 3.0
COCOMO 81 Model	Yes
COCOMO II Model	Yes
Incremental COCOMO II	Yes
Function Point Sizing	Yes
Subcomponents	Yes
COSYSMO 1.0 Model	Yes
COSYSMO 2.0 Model	Yes
"Software Engineering Economics" textbook	Yes
"Software Cost Estimation with COCOMO II" textbook	Yes
Printed Manual & Software on CD	Yes
Software Available by Download	Yes
Phone & e-mail Support	Yes
Calico Calibration Tool	Yes
Reports	24
Export to Excel	Yes
Monte Carlo Sizing	Yes
Risk Report	Yes
CDF Graph	Yes
PDF Graph	Yes

6 billion reasons to use SystemStar:

4	Operating Systems (Windows XP, Windows 7, Windows 8, Windows 10)
10	COCOMO & COSYSMO estimating models built in
29	Years of enhancements & improvements
1,000,000	Licensed users (almost 2 million now!)
19	Reports
5	Graphs (you can use live links to Excel to make your own)
1,269	Textbook pages describing COCOMO
17	Cost Drivers (and you can add your own)
1	Web site for information & support
(603) 672-0987	Phone number for technical support
6,037,722,341	Total

Overview of COCOMO

The COCOMO cost estimation model is used by thousands of software project managers, and is based on a study of hundreds of software projects. Unlike other cost estimation models, COCOMO is an open model, so all of the details are published, including:

- The underlying cost estimation equations
- Every assumption made in the model (e.g. "the project will enjoy good management")
- Every definition (e.g. the precise definition of the Product Design phase of a project)
- The costs included in an estimate are explicitly stated (e.g. project managers are included, secretaries aren't)

Because COCOMO is well defined, and because it doesn't rely upon proprietary estimation algorithms, SystemStar offers these advantages to its users:

- COCOMO estimates are more objective and repeatable than estimates made by methods relying on proprietary models
- COCOMO can be calibrated to reflect your software development environment, and to produce more accurate estimates

SystemStar is a faithful implementation of the COCOMO model that is easy to use on small projects, and yet powerful enough to plan and control large projects. SystemStar allows to define a software structure to meets our needs.

Introduction to the COCOMO Model

The most fundamental calculation in the COCOMO model is the use of the Effort Equation to estimate the number of Person-Months required to develop a project. Most of the other COCOMO results, including the estimates for Requirements and Maintenance, are derived from this quantity.

Source Lines of Code

The COCOMO calculations are based on your estimates of a project's size in Source Lines of Code (SLOC). SLOC is defined such that:

- Only Source lines that are DELIVERED as part of the product are included -- test drivers and other support software is excluded
- SOURCE lines are created by the project staff -- code created by applications generators is excluded
- One SLOC is one logical line of code
- Declarations are counted as SLOC
- Comments are not counted as SLOC

The original COCOMO 81 model was defined in terms of Delivered Source Instructions, which are very similar to SLOC. The major difference between DSIs and SLOC is that a single Source Line of Code may be several physical lines. For example, an "if-then-else" statement would be counted as one SLOC, but might be counted as several DSIs.

The Scale Drivers : In the COCOMO II model, some of the most important factors contributing to a project's duration and cost are the Scale Drivers. You set each Scale Driver

to describe your project; these Scale Drivers determine the exponent used in the Effort Equation.

The 5 Scale Drivers are:

- Precededness
- Development Flexibility
- Architecture / Risk Resolution
- Team Cohesion
- Process Maturity

Note that the Scale Drivers have replaced the Development Mode of COCOMO 81. The first two Scale Drivers, Precededness and Development Flexibility actually describe much the same influences that the original Development Mode did.

Cost Drivers

COCOMO II has 17 cost drivers -- you assess your project, development environment, and team to set each cost driver. The cost drivers are multiplicative factors that determine the effort required to complete your software project. For example, if your project will develop software that controls an airplane's flight, you would set the Required Software Reliability (RELY) cost driver to Very High. That rating corresponds to an effort multiplier of 1.26, meaning that your project will require 26% more effort than a typical software project.

COCOMO II defines each of the cost drivers, and the Effort Multiplier associated with each rating

- ❖ *Before Implementing the systemstardemo we need to know the equations used in calculations for COCOMO II they are*

COCOMO II Effort Equation

The COCOMO II model makes its estimates of required effort (measured in Person-Months - PM) based primarily on your estimate of the software project's size (as measured in thousands of SLOC, KSLOC)):

$$\text{Effort} = 2.94 * \text{EAF} * (\text{KSLOC})^E$$

Where

EAF Is the Effort Adjustment Factor derived from the Cost Drivers

E Is an exponent derived from the five Scale Drivers

Person-Months

Effort Adjustment Factor

The Effort Adjustment Factor in the effort equation is simply the product of the effort multipliers corresponding to each of the cost drivers for your project.

For example, if your project is rated Very High for Complexity (effort multiplier of 1.34), and Low for Language & Tools Experience (effort multiplier of 1.09), and all of the other cost drivers are rated to be Nominal (effort multiplier of 1.00), the EAF is the product of 1.34 and 1.09.

$$\text{Effort Adjustment Factor} = \text{EAF} = 1.34 * 1.09 = 1.46$$

$$\text{Effort} = 2.94 * (1.46) * (8)^{1.0997} = 42.3 \text{ Person-Months}$$

COCOMO II Schedule Equation

The COCOMO II schedule equation predicts the number of months required to complete your software project. The duration of a project is based on the effort predicted by the effort equation:

$$\text{Duration} = 3.67 * (\text{Effort})^{\text{SE}}$$

Where

Effort Is the effort from the COCOMO II effort equation

SE Is the schedule equation exponent derived from the five Scale Drivers

Continuing the example, and substituting the exponent of 0.3179 that is calculated from the scale drivers, yields an estimate of just over a year, and an average staffing of between 3 and 4 people:

$$\text{Duration} = 3.67 * (42.3)^{0.3179} = 12.1 \text{ months}$$

$$\text{Average staffing} = (42.3 \text{ Person-Months}) / (12.1 \text{ Months}) = 3.5 \text{ people}$$

The SCED Cost Driver

The COCOMO cost driver for Required Development Schedule (SCED) is unique, and requires a special explanation.

The SCED cost driver is used to account for the observation that a project developed on an accelerated schedule will require more effort than a project developed on its optimum schedule. A SCED rating of Very Low corresponds to an Effort Multiplier of 1.43 (in the COCOMO II.2000 model) and means that you intend to finish your project in 75% of the optimum schedule (as determined by a previous COCOMO estimate). Continuing the example used earlier, but assuming that SCED has a rating of Very Low, COCOMO produces these estimates:

$$\text{Duration} = 75\% * 12.1 \text{ Months} = 9.1 \text{ Months}$$

$$\text{Effort Adjustment Factor} = \text{EAF} = 1.34 * 1.09 * 1.43 = 2.09$$

$$\text{Effort} = 2.94 * (2.09) * (8)^{1.0997} = 60.4 \text{ Person-Months}$$

$$\text{Average staffing} = (60.4 \text{ Person-Months}) / (9.1 \text{ Months}) = 6.7 \text{ people}$$

the SCED cost driver means "accelerated from the nominal schedule".

All these can be selected as automatic calculation in tool so it calculates automatically for the values we enter.

IMPLEMENTATION:

MODULES:-

1. LOGIN
2. PROVIDING THE DETAILS
3. SEARCHING FOR THE PORTAL
4. ESTIMATIONS
5. LOGOUT

INPUTS FOR CASE STUDY: -

There are various inputs that we can give through tool are size, model, reuse percentage, function points, breakage, costs, rates, maintenance percentage,...

Size –1600 Model –traditional Waterfall model

This is SystemStar's main window as it initially appears (assuming you skip over the Create Estimate Wizard). The main window displays all of the data related to the current estimate and current component.

The Drivers & Size :

SystemStar automatically creates an estimate named "Estimate1" with a single component called "Component1". The new estimate takes on default values from the default model (COCOMO II.2000).

Here we named Estimate1 as Online Job portal, Component1 as Login

The most important features of this window are

- 1) the menus,
- 2) the estimate toolbar,
- 3) the component toolbar,
- 4) the Automatic Estimation panel, and a tabbed notebook .

SystemStar offers several different ways to specify the size of each software component.

For this we used the Size (SLOC) field, and entered 1600.

Now we've supplied enough information so that SystemStar can display some useful results.

The Automatic Estimation panel displays a summary of the COCOMO II calculations. The Automatic Estimation panel is four lines long and has the title "Totals for entire Project". SystemStar updates its estimates immediately as you change parameters, modify cost drivers, etc.

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (K\$)	Productivity	Equivalent Size
Requirements	RQ:	0.0	0.0	0.0		
Development	PD+DD+CT+IT:	0.0	0.0	0.0	0.0	
Total	RQ+PD+DD+CT+IT:	0.0	0.0	0.0	0.0	
Total Size: 0						

COCOMO II Cost Drivers for Component: login		
Personnel	Platform	Product
ACAP... Nominal	TIME... Nominal	RELY... Very High
APEX... Nominal	STOR... Nominal	DATA... Nominal
PCAP... Very High	PVOL... Nominal	CPLX... Nominal
PLEX... Nominal		RUSE... Nominal
LTEX... Nominal		DOCU... Nominal
PCON... Nominal		
Project	Size Summary	User Defined
TOOL... Nominal	Size: 0	USR1... Undefined
SITE... Nominal		USR2... Undefined
SCED... Nominal		USR3... Undefined
		USR4... Undefined
Method: SLOC		

COCOMO II Cost Drivers for Component: login		
Personnel	Platform	Product
ACAP... Nominal	TIME... Nominal	RELY... Very High
APEX... Nominal	STOR... Nominal	DATA... Nominal
PCAP... Very High	PVOL... Nominal	CPLX... Nominal
PLEX... Nominal		RUSE... Nominal
LTEX... Nominal		DOCU... Nominal
PCON... Nominal		
Project	Size Summary	User Defined
TOOL... Nominal	Size: 1600	USR1... Undefined
SITE... Nominal		USR2... Undefined
SCED... Nominal		USR3... Undefined
		USR4... Undefined
Method: SLOC		

MODEL :

Select Model used for the project implementation:
The model used here is COCOMO II 2000 waterfall Model

The screenshot shows the SystemStar software interface for estimating a project titled "online job portal". The main window displays the following information:

- Estimate:** online job portal ID: [] Model: COCOMO® II 2000
- Component:** login ID: [] Increment: 1
- Totals for entire Project:**

	Effort (PM)	Duration (Mo)	Cost (\$K)	Productivity	Equivalent Size
Requirements RQ:	0.3	1.0	0.0		
Development PD+DD+CT+IT:	4.7	6.0	0.0	338.9	
Total RQ+PD+DD+CT+IT:	5.1	7.0	0.0	316.8	Total Size: 1,600

- COCOMO II Scale Factors for Estimate: online job portal**
- Model:** COCOMO® II 2000
- Model ID:** 2000
- Phases:** Waterfall
- Model Type:** COCOMO II
- Precedentness:** Somewhat Unprecedented
- Development Flexibility:** Some Relaxation
- Architecture / Risk Resolution:** Often (60%)
- Team Cohesion:** Basically Cooperative
- Process Maturity:** SEI CMM Level 2
- Buttons:** Show Equations, APM Settings...
- Toolbar:** File, View, Reports, Components, Tools, Preferences, Monte Carlo, Help
- Status Bar:** Drivers & Size, Model, REVL, Reuse, Function Points, Increments, Breakage, Costs, Rates, Maint, Filter, Descr.
- Bottom Status:** online job portal: 5.1 PM, 7.0 Months | login: 5.1 PM | EAF: 0.9576 | Level: 1

A secondary window titled "Select Model" is open, listing various models:

Model Name	Short Name	ID	Type	Phases	File	Description
COCOMO II, 2000, Waterfall	COCOMO II, 2000	2000	COCOMO II	Waterfall	Built in	COCOMO
COCOMO II, 2000, MBASE	COCOMO II, 2000	2000	COCOMO II	Waterfall	Built in	COCOMO
Early Design 2000, Waterfall	Early Design 2000	2000	COCOMO II	Waterfall	Built in	COCOMO
Early Design 2000, MBASE	Early Design 2000	2000	COCOMO II	Waterfall	Built in	COCOMO
REVC, 1987	REVC	1987	COCOMO 81	Waterfall	Built in	Same Cost
COCOMO, 87	COCOMO, 87	1987	COCOMO 81	Waterfall	Built in	1987 version
COCOMO, 85	COCOMO, 85	1985	COCOMO 81	Waterfall	Built in	1985 version
COSYSMO 2.0	COSYSMO 2.0	2.00	COSYSMO	ISO 15288	Built in	Metric Guide
COSYSMO 2005 Initial Calibration -- with Reuse	COSYSMO 2005 -- with Reuse	1.00	COSYSMO	ISO 15288	Built in	COSYSMC
COSYSMO 2005 Initial Calibration	COSYSMO 2005	1.00	COSYSMO	ISO 15288	Built in	COSYSMC

Buttons at the bottom of the "Select Model" window include OK, Cancel, Apply, and Help. A note at the bottom right states: "COCOMO® is a trademark of Barry W. Boehm".

Click on show equations it display a window showing the equations used to calculate effort duration i.e, equation report

online job portal - Equations Report

Print Export... Headers << Back Next >>

online job portal - Equations Report

SystemStar 3.0 Demo October 8, 2020 12:35:54 Page: 1

Estimate Name:	online job portal	Estimate ID:
Model Name:	COCOMO® II 2000	Model ID:
Process Model:	COCOMO® II Model	Phases:

COCOMO Estimating Equations	
Effort	$1.0997 = 2.9400 * EAF * (KSLOC)$ = Effort in Person-Months
Schedule	$0.3179 = 3.6700 * (Effort)$ = Duration in Months
Maintenance Effort	$1.0997 = 2.9400 * EAF * (KSLOC)$ = Effort (per year) in Person-Months
152 hours per Person-Month	

Precededness, Development Flexibility, Architecture/Risk Resolution and Team Cohesion details are given as per the project.

FUNCTION POINTS:

To size your component in terms of Function Points we filled the counts on this tab, and SystemStar will calculate the equivalent number of Lines of Code. We can change the assumption about the conversion factor by clicking on the Change Lines per Function Point button.

SystemStar - online job portal (login)

File View Reports Components Tools Preferences Monte Carlo Help

Estimate: online job portal ID: Model: COCOMO® II 2000

Component: login ID: Increment: 1

Totals for entire Project		Effort (PM)	Duration (Mo)	Cost (KS)	Productivity	Equivalent Size
Requirements	RQ:	0.3	1.0	0.9		Total Size: 1.600
Development	PD+DD+CT+IT:	4.9	6.1	9.2	324.6	
Total	RQ+PD+DD+CT+IT:	5.3	7.1	10.0	303.3	

Function Point Settings for Component: login

	Simple	Average	Complex
External Input	EI	1	0
External Output	EO	0	0
Logical Internal File	ILF	0	0
External Interface File	EIF	0	1
External Inquiry	EQ	0	0

UnAdjusted Function Points: 16
Adjusted Function Points: 16 Change FP Adjustment Factor...
Lines per Function Point: 100 Change Lines per Function Point...
Size before REVL: 1,600

Drivers & Size / Model / REVL / Reuse / Function Points / Increments / Breakage / Costs / Rates / Maint. / Filter / Descr. /

BREAKAGE:

can use it to describe how much code in previous increments will be changed due to changes in requirements.

Increment	Percent Breakage
2	10
3	10
4	10
5	0
6	0
7	0
8	0
9	0
10	0
11	0

COSTS:

You can set the cost per Person-Month for each of the COCOMO phases in either of two ways:

- 1) Simply fill in a cost in the appropriate field.
- 2) Use the Labor Distribution Worksheet and the Rates tab to calculate the figure based on the labor classes assigned to each phase.

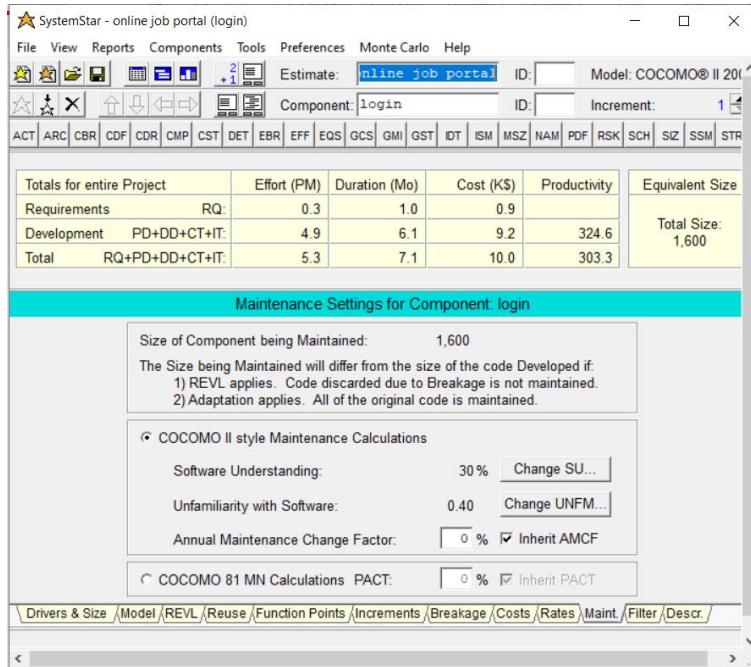
Each of these numbers is a cost for one person for one month for one of the COCOMO phases. You'll probably want to use the burdened cost (including benefits, etc.), not just the person's salary.

Phase	Cost per Person-Month	Inherit RQ	Use Rates Tab & Labor Distribution
Requirements	\$ 2500	<input type="checkbox"/>	<input type="checkbox"/>
Product Design	\$ 1500	<input type="checkbox"/>	<input type="checkbox"/>
Detailed Design	\$ 2500	<input type="checkbox"/>	<input type="checkbox"/>
Code & Unit Test	\$ 1700	<input type="checkbox"/>	<input type="checkbox"/>
Integration & Test	\$ 1600	<input type="checkbox"/>	<input type="checkbox"/>
Maintenance	\$ 1700	<input type="checkbox"/>	<input type="checkbox"/>

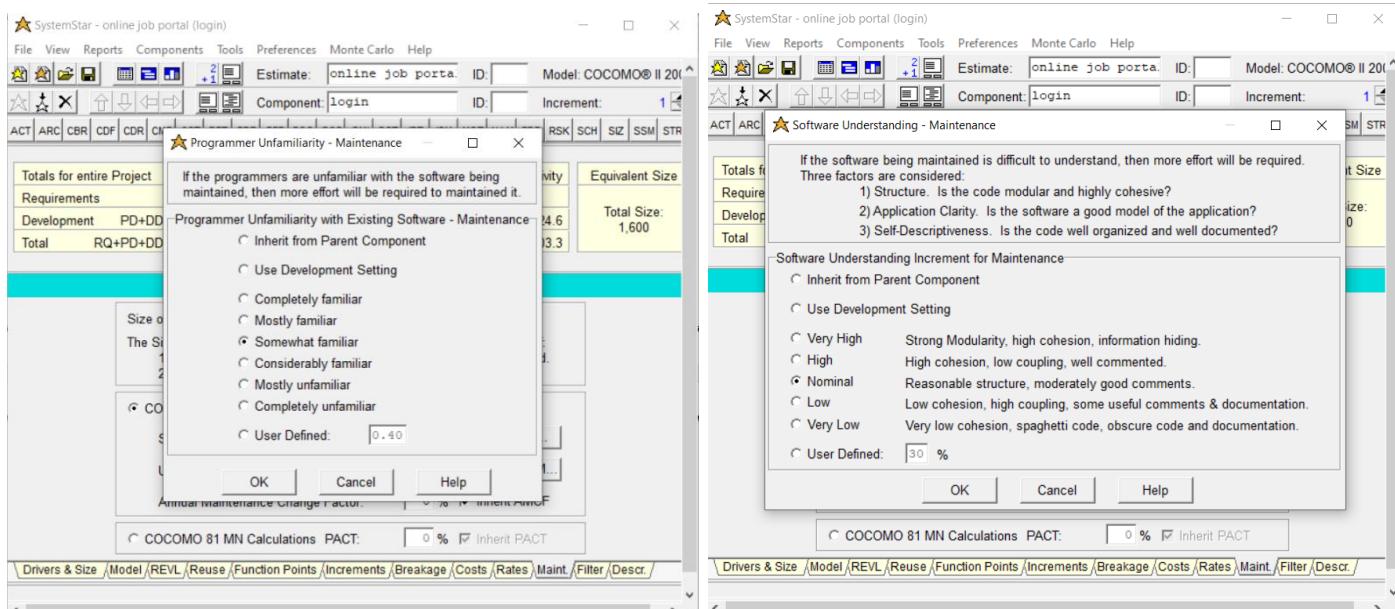
The Automatic Estimation panel now displays the costs as part of the estimate. Your software project is estimated to cost \$10000.

MAINTENANCE:

SystemStar supports both the traditional COCOMO 81 approach to estimating maintenance and the COCOMO II equations.

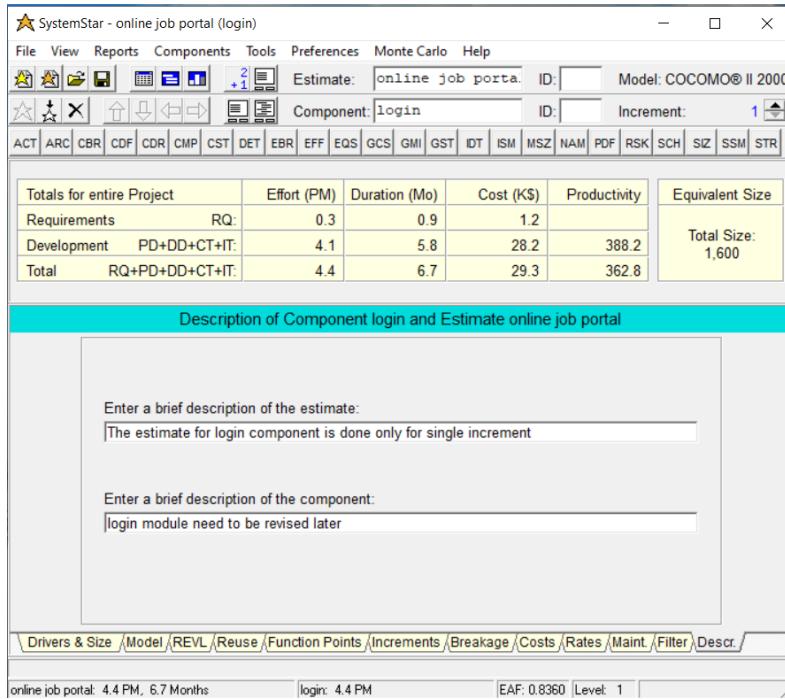


Here we used



DESCRIPTION:

This image depicts the main SystemStar Window with the Description tab selected. You can record a brief comment for the overall estimate, and a comment for each of your subcomponents.



Adding Components:

Click on the New sub component for adding components

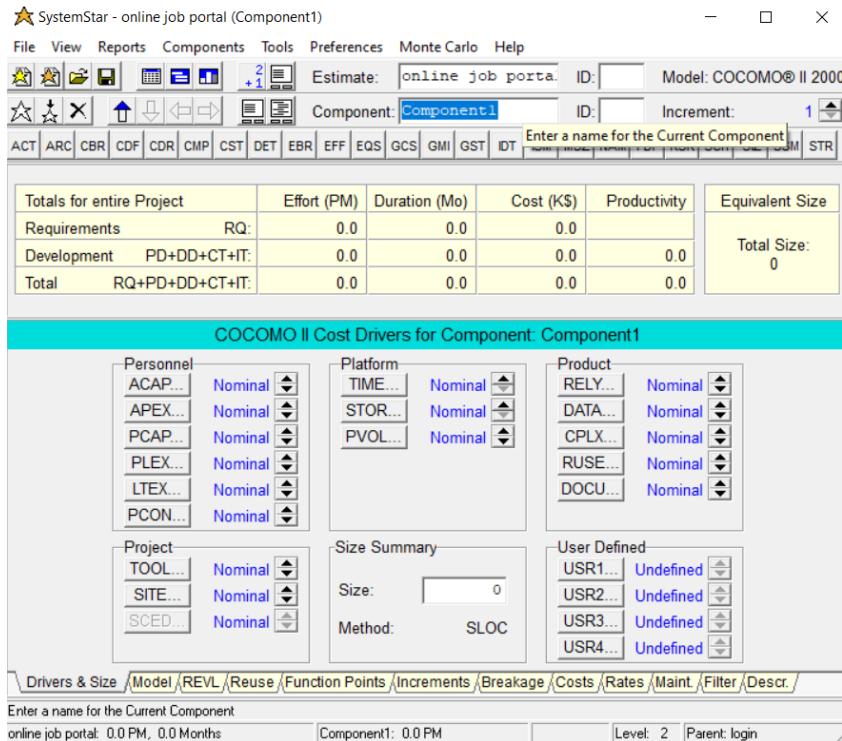
COCOMO II Cost Drivers for Component: login			
Personnel	ACAP... Nominal ▲▼	Platform	TIME... Nominal ▲▼
APEX...	Nominal ▲▼	STOR...	Nominal ▲▼
PCAP...	Nominal ▲▼	PVOL...	Nominal ▲▼
PLEX...	Nominal ▲▼	RELY...	Nominal ▲▼
LTEX...	Nominal ▲▼	DATA...	Nominal ▲▼
PCON...	Nominal ▲▼	CPLX...	Nominal ▲▼
Project	TOOL... Nominal ▲▼	RUSE...	Nominal ▲▼
SCED...	Nominal ▲▼	DOCU...	Nominal ▲▼
Size Summary		User Defined	
Size: 1600		USR1... Undefined ▲▼	
		USR2... Undefined ▲▼	
		USR3... Undefined ▲▼	
		USR4... Undefined ▲▼	

COCOMO II Cost Drivers for Component: login			
Personnel	ACAP... Nominal ▲▼	Platform	TIME... Nominal ▲▼
APEX...	Nominal ▲▼	STOR...	Nominal ▲▼
PCAP...	Nominal ▲▼	PVOL...	Nominal ▲▼
PLEX...	Nominal ▲▼	RELY...	Nominal ▲▼
LTEX...	Nominal ▲▼	DATA...	Nominal ▲▼
PCON...	Nominal ▲▼	CPLX...	Nominal ▲▼
Project	TOOL... Nominal ▲▼	RUSE...	Nominal ▲▼
SCED...	Nominal ▲▼	DOCU...	Nominal ▲▼
Size Summary		User Defined	
Size: 1600		USR1... Undefined ▲▼	
		USR2... Undefined ▲▼	
		USR3... Undefined ▲▼	
		USR4... Undefined ▲▼	

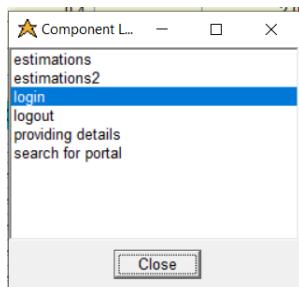
Or

Then add the components we need to estimate in the COCOMO model

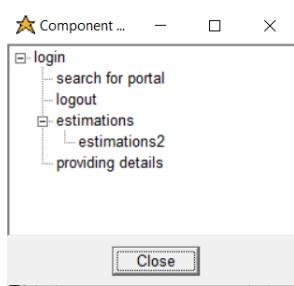
Name the components as providing details, search for portal, estimations, logout and repeat the same steps as above for login



view of components:

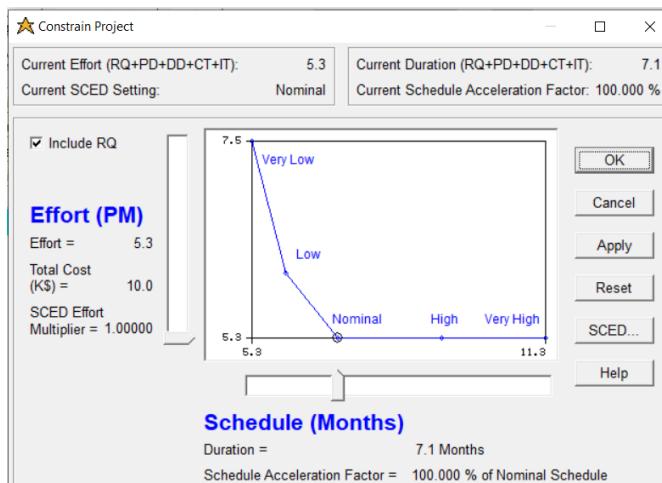
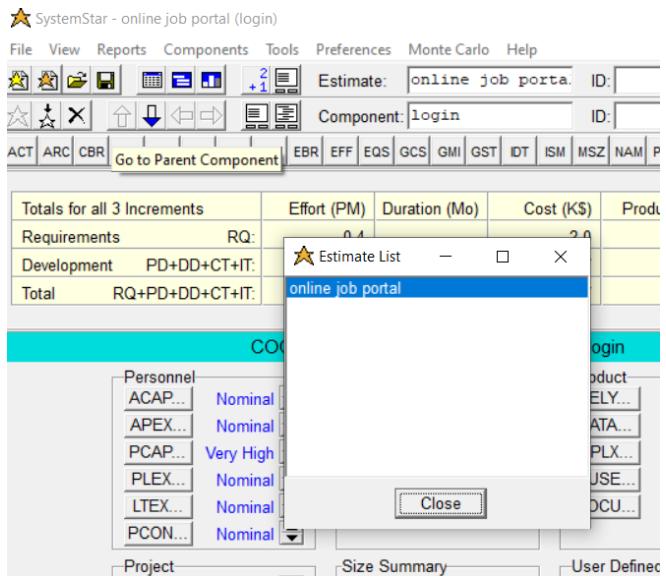


Component tree view:



We can create a number of components and view the structure to find which are the works estimations done.

Estimate List view:



REPORTS:

Detail report:

The Detail report has one page per component -- the first page of the report is for the top-level component, so it has the totals for the entire effort.

online job portal - Detail Report

Print Export... Headers << Back Next >>

online job portal - Detail Report

SystemStar 3.0 Demo October 14, 2020 16:39:16 Page: 1

Estimate Name: online job portal Estimate ID: 2000
 Model Name: COCOMO® II 2000 Model ID: 2000
 Process Model: COCOMO® II Model Phases: Waterfall

Component Name: login Component ID: 1
 Increment: 1 Level: 1
 Developed Size: 1,600 EAF: 1.0000

Phase	Effort (Person-Months)	Cost (K\$)	Duration (Months)	Staffing
RQ -- Requirements	0.3	0.9	1.0	0.4
PD -- Product Design	0.8	1.3	1.5	0.6
DD -- Detailed Design	1.3	3.3	1.5	0.9
CT -- Code & Unit Test	1.8	3.1	2.0	0.9
IT -- Integration & Test	0.9	1.5	1.2	0.8
Development (PD+DD+CT+IT)	4.9	9.2	6.1	
Totals (RQ+PD+DD+CT+IT)	5.3	10.0	7.1	
MN -- Maintenance (per year)	0.0	0.0	0.0	

Select the Schedule Report from the Reports menu.

The Schedule Report displays the staffing and cost on a month-by-month basis. The Schedule report has one line for each month, and shows the estimated staffing and cost on a month-by-month basis. The standard report header contains the date, time, estimate name (Estimate1), the Process Model (COCOMO II), etc. You can turn the headers off to save space on the screen.

online job portal - Schedule Report

Print Export... Headers << Back Next >>

online job portal - Schedule Report

SystemStar 3.0 Demo October 14, 2020 16:39:35 Page: 1

Estimate Name: online job portal Estimate ID: 2000
 Model Name: COCOMO® II 2000 Model ID: 2000
 Process Model: COCOMO® II Model Phases: Waterfall

Month	Effort this Month (Person-Months)					Cumulative Effort	Cost (K\$) This Month	Cumulative Cost (K\$)
	RQ	PD	DD	CT	IT			
1	0.3	0.0	0.0	0.0	0.0	0.4	0.9	0.9
2	0.0	0.6	0.0	0.0	0.0	0.6	0.9	0.9
3	0.0	0.3	0.5	0.0	0.0	0.8	1.7	1.7
4	0.0	0.0	0.8	0.1	0.0	0.9	2.6	2.6
5	0.0	0.0	0.0	0.9	0.0	0.9	3.5	3.5
6	0.0	0.0	0.0	0.8	0.1	0.9	4.5	4.5
7	0.0	0.0	0.0	0.0	0.8	0.8	5.2	5.2
8	0.0	0.0	0.0	0.0	0.1	0.1	5.3	5.3

Cost driver report:

online job portal - Cost Driver Report

Print Export... Headers << Back Next >>

online job portal - Cost Driver Report

SystemStar 3.0 Demo October 14, 2020 16:39:58 Page: 1

Estimate Name: online job portal Estimate ID: 2000
 Model Name: COCOMO® II 2000 Model ID: 2000
 Process Model: COCOMO® II Model Phases: Waterfall

Component Name	EAF	A	A	C	D	P	R	R	S	S	T	T	P	L	P	S	P	D
		C	P	P	A	C	E	U	C	T	I	O	L	E	T	C	V	O
login	1.0000	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	N	

Cost report:

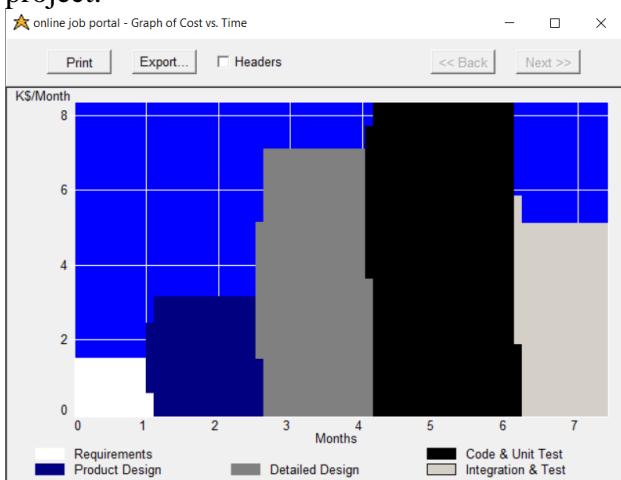
online job portal - Cost Report								
SystemStar 3.0 Demo		October 14, 2020 16:40:13		Page: 1				
Estimate Name: online job portal				Estimate ID: 2000				
Model Name: COCOMO® II 2000				Model ID: 2000				
Process Model: COCOMO® II Model				Phases: Waterfall				
Cost per Component (K\$)								
Component Name	RQ	PD	DD	CT	IT	Total RQ to IT		
login	0.9	1.3	3.3	3.1	1.5	10.0		
Cost Summary								
Component Totals	0.9	1.3	3.3	3.1	1.5	10.0		
Grand Total	0.9	1.3	3.3	3.1	1.5	10.0		

Effort report:

online job portal - Effort Report								
SystemStar 3.0 Demo		October 14, 2020 16:40:30		Page: 1				
Estimate Name: online job portal				Estimate ID: 2000				
Model Name: COCOMO® II 2000				Model ID: 2000				
Process Model: COCOMO® II Model				Phases: Waterfall				
Effort per Component (Person-Months)								
Component Name	RQ	PD	DD	CT	IT	Total RQ to IT		
login	0.3	0.8	1.3	1.8	0.9	5.3		
Effort Summary								
Component Totals	0.3	0.8	1.3	1.8	0.9	5.3		
Grand Total	0.3	0.8	1.3	1.8	0.9	5.3		

Select the Graph of Cost vs. Time from the Reports menu.

The graph indicates how much COCOMO estimates you'll be spending throughout the project.



Graph of staffing vs time This image depicts the graph of Staffing vs. Time, calculated from the COCOMO effort equation.



Activity report:

The Activity report has one page per component, and models the idea that many different activities are going on during each phase. This example shows that there is some work done on Requirements as late as the Code and Unit Test phase (CT).

Notice that besides displaying each report on the screen, you can print the report, export it to Excel, or save the report as an image.

online job portal - Activity Report													
SystemStar 3.0 Demo		October 14, 2020 16:44:31		Page: 1									
Estimate Name: online job portal				Estimate ID: Model ID: 2000 Phases: Waterfall									
Model Name: COCOMO® II 2000 Process Model: COCOMO® II Model													
Activity	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	0.4	0.0						
Product Design	0.1	0.3	0.1	0.1	0.0	0.7	0.0						
Programming	0.0	0.1	0.8	1.0	0.3	2.2	0.0						
Test Plans	0.0	0.0	0.1	0.1	0.0	0.2	0.0						
V & V	0.0	0.1	0.1	0.1	0.3	0.6	0.0						
Project Office	0.1	0.1	0.1	0.1	0.1	0.5	0.0						
CM/QA	0.0	0.0	0.1	0.1	0.1	0.3	0.0						
Manuals	0.0	0.1	0.1	0.1	0.1	0.4	0.0						
Totals	0.3	0.8	1.3	1.8	0.9	5.3	0.0						

Size report:

The Size report has one line per component, and shows the component's size & Sizing Method. Each component uses one of four sizing methods: 1) Function Points, 2) SLOC (source lines of Code), 3) Adaptation, 4) Sum of subcomponents sizes.

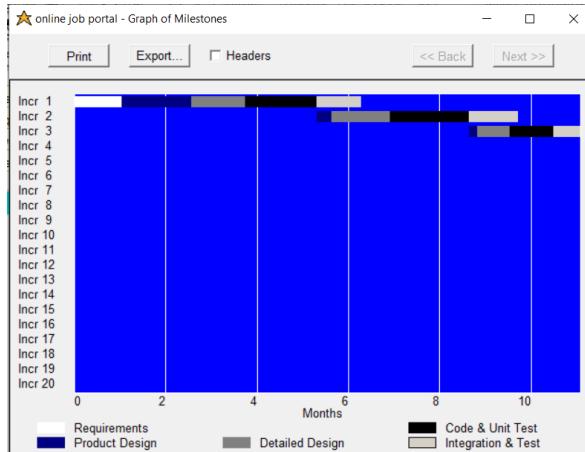
online job portal - Size Report							
SystemStar 3.0 Demo		October 14, 2020 16:43:43		Page: 1			
Estimate Name: online job portal				Estimate ID: Model ID: 2000 Phases: Waterfall			
Model Name: COCOMO® II 2000		Process Model: COCOMO® II Model		Developed Size	Sizing REVL Mthd %	New Lines	Adapted DM CM IM AASU % % % % % UNFM
Lvl Component Name							
1 login				1,600	SLOC		
Developed Size includes lines developed and discarded due to REVL and increment breakage. Developed Size is used in the estimating equations.							

The Graph of Milestones:

The graph shows when each phase of each increment will start and end. It also lets you see how the increments are synchronized.

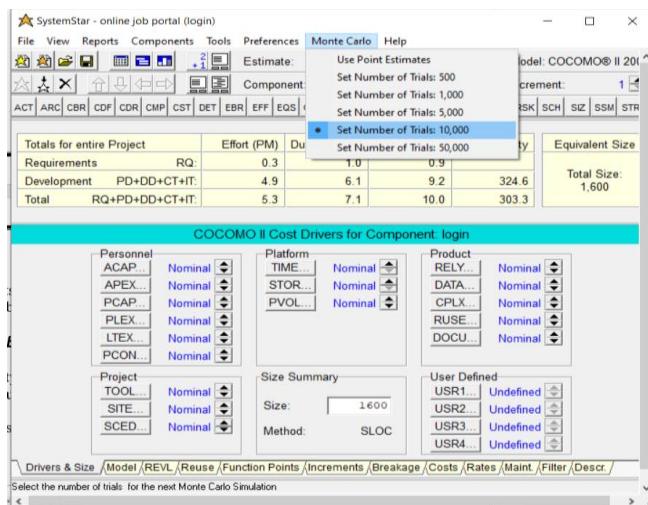
You can break your estimate up into as many as 20 increments. Using an incremental approach lets you deliver a release to your customer earlier, reducing risks.

Here we included increments



MONTECARLO SIMULATIONS:

- Rather than describing the size of your project as a point estimate, SystemStar lets to describe the size with a probability distribution.
- SystemStar runs a Monte Carlo simulation to sample your distribution, and calculates the COCOMO or COSYSMO estimates for each sample.
- The results of the Monte Carlo simulations indicate the probability that you'll be able to complete the project for a given cost (or duration, or amount of effort).
- Right-click in the Size field of either a COCOMO or COSYSMO estimate and pick Select Distribution... to display the window that lets you select a probability distribution.
- You can control the number of trials performed during the Monte Carlo simulations by using the Monte Carlo menu. A larger number of trials gives more accurate results (and nicer graphics), but take longer.

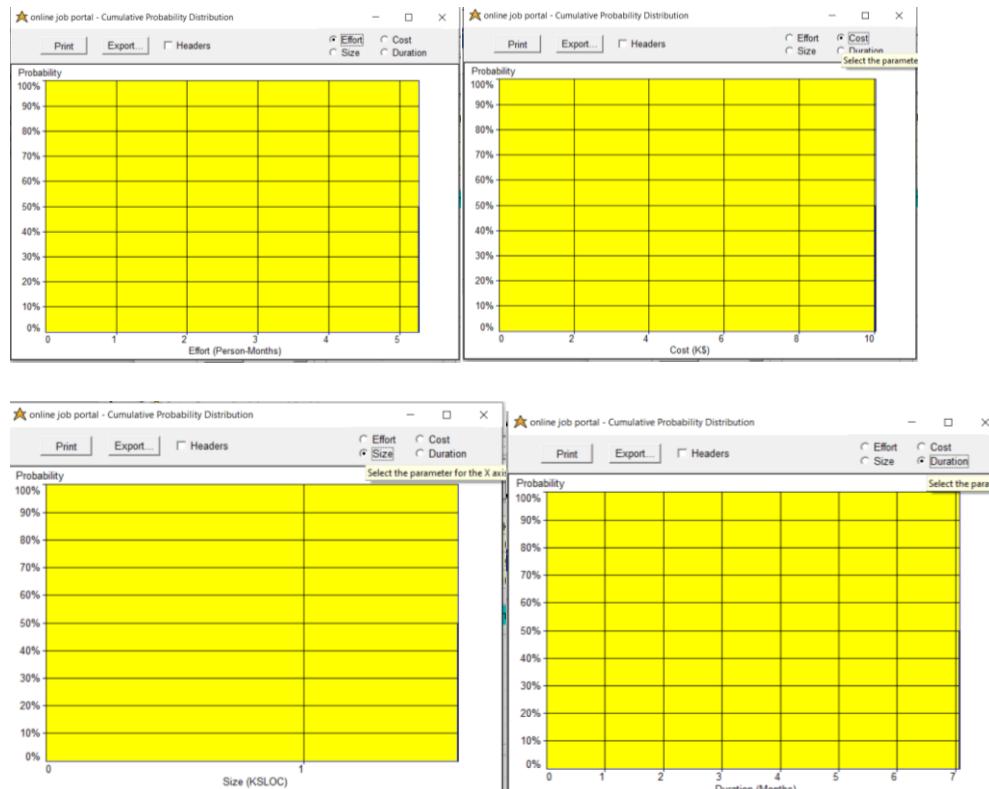


There are three new reports associated with the Monte Carlo simulations; each has a button on the Reports toolbar.

The Cumulative Probability Distribution (CDF) report:

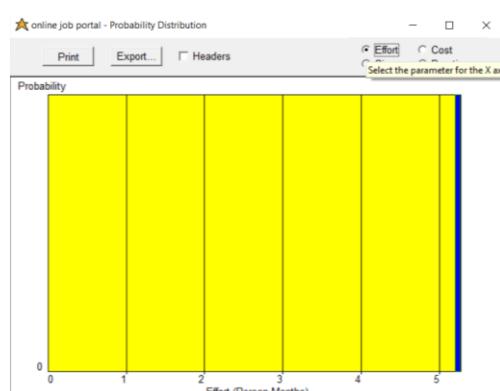
The Cumulative Probability Distribution (CDF) shows the probability of finishing your project with a certain amount of effort.

This project shows 50% of probability for all the effort, cost, size, duration



The Probability Distribution (PDF) report:

The Probability Distribution (PDF) is a histogram showing the probability of completing the project with a certain amount of effort. This didn't show any information.



Risk Report:

The Risk Report is essentially a tabular version of the CDF.

This screenshot shows a risk report for an estimate named "online job portal" using the COCOMO® II 2000 model. The report details a single data point at the 50% probability level. The columns represent Probability, Size, Effort (Person-Months), Cost (K\$), and Duration (Months).

Probability	Size	Effort (Person-Months)	Cost (K\$)	Duration (Months)
50%	1,600	5.3	10.0	7.1

Export to Excel: Feature

This screenshot shows the same risk report window with an "Export..." button highlighted. An "Export Options" dialog box is overlaid on the bottom left, showing various export options like "Export to Excel" and "Update Policy".

Probability	Size	Effort (Person-Months)	Cost (K\$)	Duration (Months)
50%	1,600	5.3	10.0	7.1

Select Export Options

This dialog box allows selecting an export option. The "Export to Excel" option is selected. Within the "Update Policy" section, "One Shot" is chosen. Other options include "Export All Reports to Excel", "Comma Separated Values (CSV)", "Legacy Text Format", and "Save as Graphic".

Export Options

Export to Excel

Update Policy

One Shot

Live Update

Export All Reports to Excel

Comma Separated Values (CSV)

Legacy Text Format

Save as Graphic

Export Cancel Help

We can select the export option as required.

The images can also be exported.