BLG411E-SOFTWARE ENGINEERING
Makeup Midterm Exam Solutions
7/12/2004

Answer 1a) Estimated Counts:

User inputs (Each distinct data is counted):
Customer info: Customer name, address, phone number.
Magazine info: Magazine title, unit price.
Subscription info: Subscription date, subscription duration, payment amount.
(Total=8)

User outputs:

i) Reports:
Renewal notices for expiring subscriptions.
Address labels for all current subscribers.

ii) On-line result screens:
A given customer's all current subscriptions.

iii) Error messages:
Warning message if payment amount is not in full.

(Total=4)

User inquiries (On-line commands and inquiry inputs):
Getting user commands from menu.
Getting a customer's name for a transaction (New subscription, Inquiry).
(Total=2)

Files (database tables):
Customers.
Magazines.
Subscriptions.
(Total=3)

We will use the average empirical weights:

Measurement parameter	Estimated Count	Average Weight	FP_count
Number of user inputs	8	4	32
Number of user outputs	4	5	20
Number of user inquiries	2	4	8
Number of files	3	10	30
Number of external interfaces	0	7	0
COUNT_TOTAL =			90

Complexity Adjustment Factors (CAF):

Factor	**Our Estimation**
1.Backup and recovery	5
2.Data communications	0
3.Distributed processing	0
4.Performance critical	2
5.Existing operating environment	0
6.On-line data entry	5
7.Input transaction over multiple screens	1
8.Master files updated on-line	5
9.Information domain values complex	1
10.Internal processing complex	2
11.Code designed for reuse	1
12.Conversion/installation in design	0
13.Multiple installations	0
14.Application designed for change	1
	+
Factor_total =	23

Scales:

0=No influence	3=Average
1=Incidental	4=Significant
2=Moderate	5=Essential

Function Points formula:

FP = Count_total * (0.65 + 0.01 * Factor_total)

= 90 * (0.65 + 0.01 * 23)

= 90 * 0.88

≅ 80

LOC = 80 $_{FP}$ * 30 $_{LOC/FP}$ = 2400 lines of code in C++ language.

KLOC ≅ 2.4

Answer 1b)

Effort Adjustment Factors (EAF):

Factor	**Range of Factor**	**Our Estimation**
Product Attributes		
1.Required reliability	0.75 – 1.40	1.40
2.Database size	0.94 – 1.16	0.98
3.Product complexity	0.70 – 1.65	0.95
Computer Attributes		
4.Execution time constraint	1.00 – 1.66	1.00
5.Main storage constraint	1.00 – 1.56	1.20
6.Virtual machine volatility	0.87 – 1.30	0.87
7.Computer turnaround time	0.87 – 1.15	0.87
Personnel Attributes		
8.Analyst capability	1.46 – 0.71	1.46
9.Programmer capability	1.42 – 0.70	0.75
10.Application experience	1.29 – 0.82	0.85
11.Virtual machine experience	1.21 – 0.90	1.00
12.Programming language experience	1.14 – 0.95	0.95
Project Attributes		
13.Use of modern programming practices	1.24 – 0.82	0.82
14.Use of SW tools	1.24 – 0.83	0.90
15.Required development schedule	1.23 –1.10	1.10
		x ———
		EAF = 0.85

Intermediate COCOMO formulas:

$PM = a * (KLOC)^b * EAF$

$T_{dev} = c * (PM)^d$

We will consider the type of this project as semi-detached. Therefore, the following empirical weights will be used:

SW Category	a	b	c	d
Semi-detached	3.0	1.12	2.5	0.35

$PM = a * (KLOC)^b * EAF$ $= 3.0 * (2.4)^{1.12} * 0.85$ $\cong 7$ person-months	$T_{dev} = c * (PM)^d$ $= 2.5 * (7.1)^{0.35}$ $\cong 5$ months	Number of people = PM / T_{dev} $= 7 / 5$ $= 1.4$ $\cong 2$

Answer 2) A risk table consists of the following columns:

1. Definition of the risk.
2. Category of the risk: Team related; Customer related; Product specific; Business specific.
3. Probability of the risk: Estimated percentage of likelihood.
4. Impact of the risk: Catastrophic; Critical; Marginal; Negligible.
5. RMMM Plan: It is considered in the initial phase as part of the Software Project Plan.
    - Mitigation: How to avoid the risk.
    - Monitoring: What to track to determine whether the risk becoming more or less likely.
    - Management: What contingency plan should be applied if the risk becomes a reality.