

aSSIGNMENT 04

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**PART 1 : Effort Estimation Using Advanced COCOMO**:

1. Use the Advanced COCOMO model to estimate the development effort in

person-months.

**Data:**

A=3.0

B=1.12

KLOC = 300

**Formula:**

Development effort is given by:

**Effort (PM)=A×(KLOC)B×EAF**

**Solution:**

**STEP 01:**

Calculate EAF

|  |  |  |
| --- | --- | --- |
| **Cost Driver** | **Rating** | **Multiplier** |
| RELY | High | 1.15 |
| CPLX | Moderate | 1.0 |
| TIME | Moderate | 1.0 |
| ACAP | Nominal | 1.0 |
| PCAP | Nominal | 1.0 |
| TOOL | High | 0.87 |
| SCED | Nominal | 1.0 |

EAF=1.15×1.0×1.0×1.0×1.0×0.87×1.0 = 1.0005

**STEP 02:**

Calculate Effort

**Effort (PM)=A×(KLOC)B×EAF**

Effort (PM)=3.0×(300)1.12×1.0005

Effort (PM)=3.0×400.67×1.0005

Effort≈1202.40 person-months

2. Identify relevant cost drivers from the given scenario and provide justifications

for their ratings (e.g., RELY, CPLX, TIME, ACAP, PCAP, etc.).

|  |  |  |
| --- | --- | --- |
| **Cost Driver** | **Rating** | **Justification** |
| RELY | High | High reliability is needed due to the sensitive nature of healthcare data. |
| CPLX | Moderate | The system has several modules, but none are overly complex. |
| TIME | Moderate | The project must be delivered in 12 months, but no critical time constraints. |
| ACAP | Nominal | The team is mid-level with 3-5 years of experience. |
| PCAP | Nominal | Similar to ACAP, the team has moderate experience in software development. |
| TOOL | High | Modern tools (Django, React, PostgreSQL) support efficiency. |
| SCED | Nominal | The schedule is fixed at 12 months, a standard time frame. |

3. Calculate the nominal effort using the **Effort Adjustment Factor (EAF)** and

COCOMO equations.

**Data:**

A=3.0

B=1.12

KLOC = 300

**Formula:**

Nominal effort is given by:

**Nominal Effort (PM)=A×(KLOC)B×EAF**

**Solution:**

**STEP 01:**

Calculate EAF

|  |  |  |
| --- | --- | --- |
| **Cost Driver** | **Rating** | **Multiplier** |
| RELY | High | 1.15 |
| CPLX | Moderate | 1.0 |
| TIME | Moderate | 1.0 |
| ACAP | Nominal | 1.0 |
| PCAP | Nominal | 1.0 |
| TOOL | High | 0.87 |
| SCED | Nominal | 1.0 |

EAF=1.15×1.0×1.0×1.0×1.0×0.87×1.0=1.0005

**STEP 02:**

Calculate Nominal Effort

**Nominal Effort (PM)=A×(KLOC)B×EAF**

Nominal Effort (PM)=3.0×(300)1.12×1.0005

Nominal Effort (PM)=3.0×400.67×1.0005

Nominal Effort≈1202.40 person-months

**PART 2: Schedule Estimation**:

**Data:**

C=3.67

D=0.28

KLOC = 300

Effort = 1202.40 Persons-month

**Formula:**

Development effort is given by:

**Schedule (TDEV)=C×(Effort (PM))D**

**Solution:**

Calculate Schedule

TDEV=3.67×(1202.40)0.28

TDEV=3.67×7.89

TDEV≈28.96 months

**PART 3: Analysis and Recommendations**:

**Analysis**

|  |  |  |  |
| --- | --- | --- | --- |
| **Cost Driver** | **Rating** | **Impact On Effort** | **Impact On Schedule** |
| RELY | High | Increases effort due to high reliability requirements. | Increases time for thorough testing and debugging. |
| CPLX | Moderate | No significant impact. | Moderate complexity, no significant effect on time. |
| TIME | Moderate | No significant impact, reasonable 12-month deadline. | Keeps pace steady, no need for aggressive optimizations. |
| ACAP | Nominal | No impact; analysts are mid-level. | No delays; analysts can meet deadlines. |
| PCAP | Nominal | No impact; programmers are mid-level. | No major effect on the timeline. |
| TOOL | High | Reduces effort due to efficient modern tools. | Slight acceleration in development tasks. |
| SCED | Nominal | No adjustment needed; standard 12-month timeline. | Schedule is realistic and well-paced. |

**Recommendations**

|  |  |
| --- | --- |
| **S NO** | **Recommendation** |
| 1 | **Increase team size or outsource** to reduce workload and meet the 12-month deadline. |
| 2 | **Use Agile methodology** to prioritize core features and deliver them incrementally. |
| 3 | **Reduce scope** by focusing on essential features and delaying non-critical modules. |
| 4 | **Automate testing** to save time and reduce manual effort. |
| 5 | **Engage external consultants early** to avoid delays related to compliance changes. |
| 6 | **Increase team size or outsource** to reduce workload and meet the 12-month deadline. |
| 7 | **Use Agile methodology** to prioritize core features and deliver them incrementally. |

**PART 4 : Risks and Alignments**

|  |  |
| --- | --- |
| **Risks** | **Alignments** |
| Frequent changes in requirements. | Estimated effort exceeds available person-months. |
| System integration complexity. | Focus on delivering a minimum viable product (MVP). |
| External dependencies on consultants. | Add specialized resources if needed |
| Time pressure and potential skill mismatches. | Regularly monitor progress with Agile sprints to ensure timely delivery. |
| Increased effort due to scope creep and delays. |  |
| Mitigation: Adopting Agile, breaking into smaller modules, clear communication, and targeted training. |  |