

aSSIGNMENT 04

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**REPORT ON EFFORT ESTIMATION FOR HEALTHCARE MANAGEMENT SYSTEM DEVELOPMENT**

A healthcare organization has requested the development of a Healthcare Management System (HMS) to manage patient records, appointments, billing, and provide data analytics for hospital administrators. To estimate the development effort, the Advanced COCOMO model has been used, with a focus on identifying key cost drivers that impact both effort and project schedule.

The report encompasses:

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

**PART 2: Schedule Estimation**

**PART 3: Analysis and Recommendations**

**PART 4 : Risks and Alignments**

**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

**Solution:**

|  |  |  |
| --- | --- | --- |
| **Cost Driver** | **Rating** | **Multiplier** |
| RELY | Very High | 1.40 |
| CPLX | HIgh | 1.15 |
| TIME | Moderate | 1.0 |
| ACAP | Low | 1.19 |
| PCAP | Low | 0.86 |
| TOOL | High | 0.91 |
| DATA | High | 1.08 |

**EAF=RELY x CPLX x TIME x ACAP x PCAP x DATA x TOOL**

EAF = 1.40 x 1.15 x 1.11 x 1.19 x 0.86 x 1.08 x 0.91

EAF = 1.6643

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 | Very High | High reliability is needed due to the sensitive nature of healthcare data. |
| CPLX | High | The system has several complex modules |
| TIME | Moderate | The project must be delivered in 12 months, but no critical time constraints. |
| ACAP | Low | The team is low-level with 3-5 years of experience. |
| PCAP | Low | Similar to ACAP, the team has little experience in software development. |
| TOOL | High | Modern tools (Django, React, PostgreSQL) support efficiency. |
| DATA | High | 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 (For Semi-detached Projects)

KLOC = 300

**Formula:**

Nominal effort is given by:

**Nominal Effort (PM)=A×(KLOC)B×EAF**

**Solution:**

Since EAF = 1.6643

**Nominal Effort (PM)=A×(KLOC)B×EAF**

Nominal Effort (PM)=3.0×(300)1.12×1.6643

Nominal Effort (PM)=3.0×400.67×1.6643

Nominal Effort≈2969.810 person-months

**PART 2: Schedule Estimation**:

**Data:**

C=2.5

D=0.35(For Semi-detached Projects)

KLOC = 300

Effort = 2969.810 Persons-month

**Formula:**

**Schedule (TDEV)=C×(Effort (PM))D**

**Solution:**

TDEV=2.5×(2969.810)0.35

TDEV≈241.0577 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 | HIgh | 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 | Low | No impact; analysts are low-level. | No delays; analysts can meet deadlines. |
| PCAP | Low | No impact; programmers are low-level. | No major effect on the timeline. |
| TOOL | High | Reduces effort due to efficient modern tools. | Slight acceleration in development tasks. |
| DATA | High | 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. |  |

In conclusion, the Advanced COCOMO analysis reveals that developing the Healthcare Management System within the 12-month target is challenging due to high complexity and reliability requirements. Strategic adjustments, including scope prioritization and resource optimization, are essential to ensure timely and successful project delivery.