**การประมาณ (Estimation)**

1. Unadjusted Use Case Point (UUCP)

$$UUCP = \sum(Wa \times Ai) + \sum(Wu \times UCi)$$

- Weight of Use Case (Wu)
- Weight of Actor (Wa)
- Actor (Ai)
- Use case (UCi)

**Weight of Use Case table**

| Use Case Classification | No. of Transactions | Weight |
|---|---|---|
| Simple | 1 to 3 transactions | 5 |
| Average | 4 to 7 transactions | 10 |
| Complex | 8 or more transactions | 15 |

- จำนวน transations คือการติดต่อ จำนวนการติดต่อระหว่าง front-end กับ back-end

**Weight of Actor table**

| Actor Classification | Type of Actor | Weight |
|---|---|---|
| Simple | External system that must interact with the system using a well-defined API | 1 |
| Average | External system that must interact with the system using standard communication protocols (e.g. TCP/IP, FTP, HTTP, database) | 2 |
| Complex | Human actor using a GUI application interface | 3 |

## Use case points (UCP)

$$UCP = UUCP \times TCF \times ECF$$

- Weight of Use Case (UUCP)
- Technical Complexity Factor (TCF)
- Environmental Complexity Factor (ECF)

**Technical Complexity Factor table**

| Factor | Description | Weight |
|---|---|---|
| T1 | Distributed system | 2.0 |
| T2 | Response time/performance objectives | 1.0 |
| T3 | End-user efficiency | 1.0 |
| T4 | Internal processing complexity | 1.0 |
| T5 | Code reusability | 1.0 |
| T6 | Easy to install | 0.5 |
| T7 | Easy to use | 0.5 |
| T8 | Portability to other platforms | 2.0 |
| T9 | System maintenance | 1.0 |
| T10 | Concurrent/parallel processing | 1.0 |
| T11 | Security features | 1.0 |
| T12 | Access for third parties | 1.0 |
| T13 | End user training | 1.0 |

$TCF = 0.6 + (TF/100)$

**Environmental Complexity Factor table**

| Factor | Description | Weight |
|---|---|---|
| E1 | Familiarity with development process used | 1.5 |
| E2 | Application experience | 0.5 |
| E3 | Object-oriented experience of team | 1.0 |
| E4 | Lead analyst capability | 0.5 |
| E5 | Motivation of the team | 1.0 |
| E6 | Stability of requirements | 2.0 |
| E7 | Part-time staff | -1.0 |
| E8 | Difficult programming language | -1.0 |

$ECF = 1.4 + (-0.03 \times EF)$

กำหนดค่า **Productivity Factor (PF)** ไว้ที่ 5 ดังนั้น แรงงานที่ใช้ในการพัฒนาโครงการนี้คำนวณได้จาก

man-hrs = UCP x PF

cost-hrs = Salary / (day of work x hour of work)

cost of work = man-hrs x cost-hrs

selling price = cost of works x Factor of profit

* Factor of profit จะอยู่ 3 - 5

**Example (แยกราย use case)**

1 Use case มี transaction 2 ครั้ง => Wu = 5

1 Actor => Wa = 3

จาก UUCP = $\sum$(Wa x Ai) + $\sum$(Wu x UCi)

แทนค่า UUCP = (3 x 1) + (5 x 1)

UUCP = 8

**กำหนด** **Technical Complexity Factor (TCF) = 1**

**Environmental Complexity Factor (ECF) = 1**

UCP = UUCP x TCF x ECF

UCP = 8 x 1 x 1

UCP = 8 points

**กำหนด** **Productivity Factor (PF) = 5**

จาก man-hrs = UCP x PF

แทนค่า man-hrs = 8 x 5

man-hrs = 20 man/hr

จาก works-hrs = Salary / (day of work x hour of work)

**กำหนด** **Salary = 18,000 bath/month**

**day of work = 20 days/month**

**hour of work = 8 hrs/day**

แทนค่า cost-hrs = 18,000 / (20 x 8)

cost-hrs = 112.5 bath/hr

จาก cost of works = man-hrs x cost-hrs

แทนค่า cost of works = 20 x 112.5

cost of works = 2,250 bath

จาก selling price = cost of works x Factor of profit

**กำหนด** Factor of profit = 5

แทนค่า selling price = 2,250 x 5

selling price = 11,250 bath **Answer**

**Example (ทั้งโครงการ)**

2 Use case มี transaction 2 ครั้ง => Wu = 5

1 Use case มี transaction 5 ครั้ง => Wu = 10

2 Actor => Wa = 3

จาก UUCP = $\sum$(Wa x Ai) + $\sum$(Wu x UCi)

แทนค่า UUCP = (3 x 2) + ((5 x 2)+(10 x 1))

UUCP = 26

**กำหนด** **Technical Complexity Factor (TCF) = 1**

**Environmental Complexity Factor (ECF) = 1**

UCP = UUCP x TCF x ECF

UCP = 26 x 1 x 1

UCP = 26 points

**กำหนด** **Productivity Factor (PF) = 5**

จาก man-hrs = UCP x PF

แทนค่า man-hrs = 26 x 5

man-hrs = 130 man/hr

จาก works-hrs = Salary / (day of work x hour of work)

**กำหนด** **Salary = 18,000 bath/month**

**day of work = 20 days/month**

**hour of work = 8 hrs/day**

แทนค่า cost-hrs = 18,000 / (20 x 8)

cost-hrs = 112.5 bath/hr

จาก cost of works = man-hrs x cost-hrs

แทนค่า cost of works = 130 x 112.5

cost of works = 14,625 bath

จาก selling price = cost of works x Factor of profit

**กำหนด** Factor of profit = 5

แทนค่า selling price = 14,625 x 5

selling price = 73,125 bath **Answer**

Burndown Chart

Sprint ที่ 1 งานมี 90 tasks

timeline 4 weeks

| | new task | close | balance |
|---|---|---|---|
| week 1 | 40 | 0 | 40 |
| week 2 | 30 | 25 | 45 |
| week 3 | 20 | 55 | 10 |
| week 4 | 0 | 10 | 0 |