Effort Estimation Using Use Case Points

Unadjusted Actor Weight

|  |  |  |
| --- | --- | --- |
| Actor type | Description of how to recognize the actor type | Weight |
| Simple | The actor is another system which interacts with our system through a defined application programming interface (API). | 1 |
| Average | The actor is a person interacting through a text- or numeric-based user interface, or another system interacting through a protocol, such as a network communication protocol. | 2 |
| Complex | The actor is a person interacting with our system through a graphical user interface (GUI). | 3 |

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| --- | --- | --- | --- |
| Actor name | Description of Relevant Characteristics | Complexity | Weight |
| Lessor | Lessor is interacting with the system via a graphical user interface. | Complex | 3 |
| Lessee | Lessee is interacting with the system via a graphical user interface. | Complex | 3 |
| Shopping cart | Shopping cart is another system which interacts with our system through a defined API. | Complex | 3 |
| Administrator | Administrator interacts with the system through command line or text based interface | Average | 2 |
| Database | Database is another system interacting through a protocol. | Average | 2 |
| Application | The Application is a system interacting with our system | Simple | 1 |
| User Interface | The User Interface is a system interacting with our system | Simple | 1 |

UAW = 3\* Complex + 2\* Average + 2 \* Simple = 15

Unadjusted Use Case Weight

|  |  |  |
| --- | --- | --- |
| Use casecategory | Description of how to recognize the use-case category | Weight |
| Simple | Simple user interface.  Up to one participating actor (plus initiating actor). Number of steps for the success scenario: ≤ 3. If presently available, its domain model includes ≤ 3 concepts. | 5 |
| Average | Moderate interface design. Two or more participating actors. Number of steps for the success scenario: 4 to 7. If presently available, its domain model includes between 5 and 10 concepts. | 10 |
| Complex | Complex user interface or processing. Three or more participating actors. Number of steps for the success scenario: ≥ 7. If available, its domain model includes ≥ 10 concepts. | 15 |

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| --- | --- | --- | --- |
| Use Case | Description | Category | Weight |
| UC-1: Registration | Simple interface design. Two participating actors. 2 steps for main success scenario. | Simple | 5 |
| UC-2: Login | Simple interface design. Two participating actors. 2 steps for main success scenario. | Simple | 5 |
| UC-3: Manage personal information | Simple interface design. Two participating actors. 3 steps for main success scenario. | Simple | 5 |
| UC-4: Publish goods | Moderate interface design. Two particapating actors. 5 steps for main success scenario. | Average | 10 |
| UC-5: Delete/Modify product | Moderate interface design. Two particapating actors. 5 steps for main success scenario. | Average | 10 |
| UC-6: Search and view goods | Moderate interface design. Two particapating actors. 5 steps for main success scenario. | Average | 10 |
| UC-7: Filter goods according to specific conditions | Moderate interface design. Two particapating actors. 5 steps for main success scenario. | Average | 10 |
| UC-8: Shopping cart checkout | Moderate interface design. Four particapating actors. 11 steps for main success scenario. | Complex | 15 |
| UC-9: Full purchase of goods | Moderate interface design. Four particapating actors. 5 steps for main success scenario. | Average | 10 |
| UC-10: Payment procedure | Simple interface design. Two participating actors. 4 steps for main success scenario. | Simple | 5 |
| UC-11: comments | Simple interface design. Two participating actors. 4 steps for main success scenario. | Simple | 5 |
| UC-12: View order status | Simple interface design. Two participating actors. 4 steps for main success scenario. | Simple | 5 |

UUCW = 1\* Complex + 5\* Average + 6 \* Simple = 95

UUCP = UAW + UUCW = 110

Technical Complexity Factors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Technicalfactor | Description | Weight | Perceived complexity | Calculated factor (Weight × Perceived Complexity) |
| T1 | Distributed Web based system | 2 | 3 | 2×3=6 |
| T2 | Users expect good performance but nothing exceptional | 1 | 3 | 1×3=3 |
| T3 | End-user expects efficiency but there are no exceptional demands | 1 | 3 | 1×3=3 |
| T4 | Internal processing is relatively simple | 1 | 1 | 1×1=1 |
| T5 | No requirement for reusability | 1 | 0 | 1×0=0 |
| T6 | Easy to change required (different goods) | 1 | 3 | 1×3=3 |
| T7 | Ease of use is very important | 0.5 | 5 | 0.5×5=2.5 |
| T8 | No portability concerns beyond a desire to keep database vendor options open | 2 | 2 | 2×2=4 |
| T9 | Concurrent use is required | 1 | 3 | 1×3=3 |
| T10 | No direct access for third parties | 1 | 0 | 1×0=0 |
| T11 | Security is a significant concern | 1 | 5 | 1×5=5 |
| T12 | No unique training needs | 1 | 0 | 1×0=0 |
| Technical Factor Total: | | | | 30.5 |

TCF = 0.6 + 0.01 × Technical Factor Total = 0.6 + 0.01 × 30.5 = 0.905

Environmental Complexity Factors

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Environmentalfactor | Description | Weight | Perceived  Impact | Calculated factor (Weight × Perceived Impact) |
| E1 | Beginner familiarity with the UML-based development | 1.5 | 1 | 1.5×1=1.5 |
| E2 | Some familiarity with application problem | 0.5 | 2 | 0.5×2=1 |
| E3 | Some knowledge of object-oriented approach | 1 | 2 | 1×2=2 |
| E4 | Beginner lead analyst | 0.5 | 1 | 0.5×1=0.5 |
| E5 | Highly motivated, but some team members occasionally slacking | 1 | 3 | 1×3=3 |
| E6 | Stable requirements expected | 2 | 4 | 2×4=8 |
| E7 | No part-time staff will be involved | -1 | 2 | -1×2=0 |
| E8 | Programming language of average difficulty will be used | -1 | 3 | -1×3=-3 |
| Environmental Factor Total: | | | | 13 |

ECF = 1.4 - 0.03 × Environmental Factor Total = 1.4 - 0.03 × 13 = 1.01

Use Case Points

UCP = UUCP × TCF × ECF  
From the above calculations, the UCP variables have the following values:  
UUCP = UAW + UUCW = 15 + 95 = 110  
TCF = 0.905  
ECF = 1.01  
For the case study, the final UCP is the following:  
UCP = 110 × 0.905 × 1.01 = 100.5455 or 101 use case points.