

ParkingSpotter - Software Estimation Report

Function Point Analysis (FPA)

1. External Inputs (EI)

User inputs that add, change, or delete data in the system.

| Feature | Description | Weight |
|-------------------------------------|--------------------------------------|------------|
| Register User | Create new user (driver or operator) | Low - 3 |
| Login | Login functionality | Medium - 4 |
| Create Parking | Introduce new parking | Low - 3 |
| Edit Profile | Users update their info | Low - 3 |
| Edit Parking | Operators edit parking information | Low - 3 |
| Delete Parking | Operators delete parking | Low - 3 |
| Create Reservation | Drivers reserve parking | Medium - 4 |
| Cancel Reservation | Drivers cancel parking reservation | Low - 3 |
| Sensor event ingestion (enter/exit) | Sensors inject data in the system | High - 6 |
| Create Ticket | Users create assistance tickets | Low - 3 |
| Reservations Checker | Update reservation status regularly | Low - 3 |

2. External Outputs (EO)

Outputs that present data to the user, including system-generated messages or reports.

| Feature | Description | Weight |
|---------------|--|---------|
| Parking Stats | Parkings utilizations, available spots | Low - 4 |

| | | |
|-------------------------------|----------------------------|---------|
| Admin dashboard metrics | Ticket, reservations stats | Low - 4 |
| Reservation price calculation | Total cost | Low - 4 |

3. External Inquiries (EQ)

Simple requests for data from the system (read-only, no updates).

| Feature | Description | Weight |
|-------------------------------------|--|------------|
| Nearby parking list | Parkings list nearby | Medium - 4 |
| Login / auth check | Authentication and authorization | Low - 3 |
| Get parking details by id | Parking informations | Low - 3 |
| Get user reservations (history) | User reservations list | Low - 3 |
| Get active reservations for parking | Number of active reservations in a parking | Medium - 4 |
| Get latest n users (admin) | Latest n users registered | Low - 3 |
| Get latest n parkings (admin) | Latest n parkings created | Low - 3 |
| Get parkings for operator (admin) | Parkings list from operator email | Low - 3 |
| Get tickets list (admin) | Open tickets list | Low - 3 |
| Get user uniqueCode | Operator uniqueCode | Medium - 4 |

4. Internal Logical Files (ILF)

Logical data the system maintains internally.

| File | Description | Weight |
|----------|---------------------|---------|
| Users | Users profiles | Low - 7 |
| Parkings | Parkings registered | Low - 7 |

| | | |
|--------------|----------------------|-------------|
| Reservations | Reservations created | Medium - 10 |
| Tickets | Tickets created | Low - 7 |

5. External Interface Files (EIF)

Files used by the system but maintained by others (e.g., external APIs).

| Integration | Description | Weight |
|-------------------|--------------------------------|------------|
| OpenStreetMap API | Location & distance estimation | Medium - 7 |
| Google Maps API | Navigation | Low - 5 |

| Function Type | Low | Medium | High | FP Total |
|--------------------------------|-----|--------|------|------------|
| External Inputs (EI) | 8 | 2 | 1 | 38 |
| External Outputs (EO) | 3 | 0 | 0 | 12 |
| External Inquiries (EQ) | 7 | 3 | 0 | 33 |
| Internal Logical Files (ILF) | 3 | 1 | 0 | 31 |
| External Interface Files (EIF) | 1 | 1 | 0 | 12 |
| Total (Unadjusted FP) | | | | 126 |

Value Adjustment Factor (VAF)

Assuming standard average system characteristics: VAF = 1.05

Adjusted Function Points

Adjusted FP = $126 \times 1.05 = 132$ FP

COCOMO II Estimation

Calculation Summary

1 FP \approx 50 LOC \rightarrow **132 FP \times 50 = 6600 LOC = 6.60 KLOC**

- A = 2.94 (organic project), B = 1.1
- EAF \approx 1.07 (average cost drivers)

Initial Effort (unadjusted):

Effort = $2.94 \times (6.60)^{1.1} \times 1.07 \approx 25$ Person-Months

Schedule Estimation

Schedule = $3.67 \times (\text{Effort})^{0.317} \approx 3.67 \times (25)^{0.317} \approx 10$ Months

Summary Table

| Metric | Estimate |
|--------------------------|---------------------------|
| Adjusted Function Points | 132 FP |
| Estimated LOC | ~6600 LOC |
| Effort | 25 Person-Months |
| Timeline | 10 Months |
| Ideal Team Size | From 2 to 3 Developers |