

Estimation Work
University of Iowa



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1 Estimation Overview

Software Size is the complete set of business functionalities that the end user gets when the product is deployed and in use. Software Development Effort is the time required to produce the software project of a given size.

2 Size

2.1 Functional Point Analysis

$$FP * Hrs/FP = Hrs$$

$$AFP = RFP * DI \text{ Factor}$$

$$DI \text{ Factor} = \text{Environmental Influencing Factor}$$

2.2 Degrees of Influence

Scale of 0 (No Influence) to 5 (Most Influence)

Examples:

1. Backup and recovery
2. Data communications
3. Distributed processing functions
4. Performance
5. Run in an existing, heavily utilized operational environment
6. Online data entry
7. Input transaction over multiple screens
8. Master files updated online
9. Complex Inquiries
10. Complex Internal Processing
11. Reusable Code
12. Conversion and installation
13. Multiple installation in different organizations
14. Ease of use

2.3 Complexity Determination

Complexity Determination - Inputs

| # of files | <5 Fields | >5<16 Fields | >16 Fields | Multi Tab |
|------------|-----------|--------------|------------|-----------|
| <2 | S | S | A | C |
| 2 | S | A | C | C |
| >2 | A | C | C | C+ |

Complexity Determination – Inquiry

| # of Recs | <15 Fields | >15<25 Fields | >25 Fields | Perform Volume #users |
|-----------|------------|---------------|------------|-----------------------|
| <2 | S | S | A | C |
| 2-6 | S | A | C | C |
| >6 | A | C | C | C+ |

Complexity Determination – Logical File

| # of Recs | <15 Fields | >15<25 Fields | >25 Fields | Perform Volume #users |
|-----------|------------|---------------|------------|-----------------------|
| <2 | S | S | A | C |
| 2-6 | S | A | C | C |
| >6 | A | C | C | C+ |

Complexity Determination - Outputs

| # of files | <5 Fields | >5<20 Fields | >20 Fields | User Specific |
|------------|-----------|--------------|------------|---------------|
| <2 | S | S | A | C |
| 2-4 | S | A | C | C |
| >4 | A | C | C | C+ |

2.4 Assumptions

- The voter view of the web application is a restricted version of the administrator view.
- Precincts are predefined in database

2.5 Fields & Files

| | Fields | Files |
|------------------------|--|--|
| Sign Up | <ul style="list-style-type: none"> • First Name • Last Name • Email • Username • Password | <ul style="list-style-type: none"> • Database Connection • Invalid Entry • Send Email |
| Login | <ul style="list-style-type: none"> • Username • Password • Forgot Password | <ul style="list-style-type: none"> • Valid Username • Valid Password • Invalid Entry • Database Connection |
| Logoff | <ul style="list-style-type: none"> • N/A (Button Click) | <ul style="list-style-type: none"> • Change Page |
| Forgot Password | <ul style="list-style-type: none"> • Username • Email | <ul style="list-style-type: none"> • Verify Valid User • Sent Email • Change Page |

| | | |
|------------------------|--|--|
| Voter Reg | <ul style="list-style-type: none"> • First Name • Last Name • Middle Name • DOB Month • DOB Day • DOB Year • Residence Address • Residence City • Mailing Address • Mailing City • Mailing Zip Code • Previous Registered (Y/N) • Phone • Previous City • Previous County • Previous State • Part Affiliation • Citizen • 18+ | <ul style="list-style-type: none"> • Database Connection • Incomplete form • Valid Entries • Send Email |
| Voting | <ul style="list-style-type: none"> • Variable Number of People Running for Office • Potentially ~ 37 Entry Possibilities, multiple for each category | <ul style="list-style-type: none"> • President/Vice • Senator • US Representative Districts • Amendment Changes • County Commissioner • Other County Positions • Mayor • Council Member • Database Connection |
| Create Election | <ul style="list-style-type: none"> • State • Precinct • Demographic • Federal Offices • State Offices • Amendment Changes • County Offices | <ul style="list-style-type: none"> • List of States • Database Connection • List of Demographics • List of Offices • Generate Ballot • Send Emails |
| Admin View | <ul style="list-style-type: none"> • Create Ballot • Search • Change Password | <ul style="list-style-type: none"> • Create Ballot Page • Search Demographics • Search Location • Change Password Page |
| Voter View | <ul style="list-style-type: none"> • Vote • Change Password • Re-register to vote | <ul style="list-style-type: none"> • Change Password Page • Vote Page • Voter Registration Page |

2.6 Calculation

| | Type | Fields | Files | DI Factor | Complexity | RFP | AFP |
|------------------------|---------|------------------|-------|-----------|------------|-----|-----|
| Sign Up | Input | 5 | 3 | 4 | Average | 4 | 16 |
| Login | Input | 3 | 4 | 4 | Average | 4 | 16 |
| Logoff | Output | 1 | 1 | 1 | Simple | 3 | 3 |
| Forgot Password | Inquiry | 2 | 3 | 4 | Simple | 3 | 12 |
| Voter Reg | Input | 19 | 4 | 4 | Average | 4 | 16 |
| Voting | Inquiry | Varies (> 16) | 9 | 4 | Average | 4 | 16 |
| Create Election | Inquiry | 8 | 6 | 4 | Average | 4 | 16 |
| Admin View | Output | 3 | 4 | 1 | Simple | 3 | 3 |
| Voter View | Output | 3 | 3 | 1 | Simple | 3 | 3 |

3 Effort

Effort = Adjusted Function Point * Productivity Factor

3.1 Productivity

The following productivity value is based on past experience and are to be continually revised.

Productivity = Function Point * (Hrs / Function Point)

Depends on:

1. Tools Used
2. Skill of the Team
3. Quality Requirements
4. Motivation

Current Value: 1hr

3.2 Calculation

| | Adjusted Functional Point | Total |
|----------------|---------------------------|-------|
| Sign Up | 16 | 16 |

| | | |
|------------------------|----|----|
| Login | 16 | 16 |
| Logoff | 3 | 3 |
| Forgot Password | 12 | 12 |
| Voter Reg | 16 | 16 |
| Voting | 16 | 16 |
| Create Election | 16 | 16 |
| Admin View | 3 | 3 |
| Voter View | 3 | 3 |

Raw Function Point : 101

Adjusted Function Point : $101 * DI$

DI is Degree of Influence which in our case is about 3

So AFP : $101 * 3 = 303$

Now Effort = AFP * PF(Productivity Factor)

Let's assume that the project is developed on Java Platform and the 1 function point is equal to 4 hr of work, then we get around $303 * 4 = 1212$ hrs of Effort

Man Days = $1212 / (8 \text{ hr per day}) = 151$ Man Days

4 Resources

IEEE SWEBOK V3.0