

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

Features	Fields	Functions
Sign Up	<ul style="list-style-type: none"> • First Name • Last Name • Username • Password • Confirm 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"> • Logout
Forgot Password	<ul style="list-style-type: none"> • Username • Email 	<ul style="list-style-type: none"> • Verify Valid User • Sent Email • Change Page

Change Password	<ul style="list-style-type: none"> • Password • Confirm Password 	<ul style="list-style-type: none"> • Change
Voter Reg	<ul style="list-style-type: none"> • Username • DOB Month • DOB Day • DOB Year • Residence Address • Residence City • Zip Code • ID Number • Approved 	<ul style="list-style-type: none"> • Database Connection • Save Voter • Voter Registration Page
Voting	<ul style="list-style-type: none"> • Change Password • Vote • Logout 	<ul style="list-style-type: none"> • Voter Dashboard Render • See Related Features
Election	<ul style="list-style-type: none"> • Election Type • State • ElectionID 	<ul style="list-style-type: none"> • Database Connection • Election Page • Save Election • Election List
Admin View	<ul style="list-style-type: none"> • Election • Precinct • Approval • Search • Logout 	<ul style="list-style-type: none"> • Admin Dashboard Render • See Related Features
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
Candidate	<ul style="list-style-type: none"> • First Name • Last Name • Party • Precinct • ElectionID • Position 	<ul style="list-style-type: none"> • Database Connection • Form • Candidate List • Save Candidate
Approval	<ul style="list-style-type: none"> • Username • Approve • Delete 	<ul style="list-style-type: none"> • Database Connection • Approval Page • Update • Destroy
Precinct	<ul style="list-style-type: none"> • Precinct ID • ZIP 	<ul style="list-style-type: none"> • Database Connection • Page Render • Delete Precinct • Remove Precinct • Add Precinct • Add Precinct to Table
Ballot	<ul style="list-style-type: none"> • Precinct • ElectionID 	

State Geography	<ul style="list-style-type: none"> • State • ZIP • County • City 	
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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
Change Password	Inquiry	2	1	1	Simple	3	3
Voter Reg	Input	9	3	4	Average	4	16
Voting	Inquiry	3	2	4	Average	4	16
Election	Inquiry	3	4	4	Average	4	16
Admin View	Output	5	2	1	Simple	3	3
Voter View	Output	3	3	1	Simple	3	3
Candidate	Inquiry	6	4	2	Simple	3	6
Approval	Inquiry	3	4	3	Simple	3	9
Precinct	Inquiry	2	6	2	Simple	3	6
Ballot	Inquiry	2					
State Geography	Output	4					

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
Change Password	3	3
Voter Reg	16	16
Voting	16	16
Election	16	16
Admin View	3	3
Voter View	3	3
Candidate	6	6
Approval	9	9
Precinct	6	6
Ballot		
State Geography		

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