Assignment 2:

Task 1: Calculate the Basic Elements of Halstead Metrics (4 points)

```
if (principal > 0 && time > 0) {
    float interest = (principal * rate * time) / 100;
    return interest;
    }else {
    return 0; // Invalid input if principal or time is non-positive
    }
```

Operators	Line Number	Operands	Line Number	
If	1	principal	1	
(	1	0	1	
>	1	time	1	
&&	1	0	1	
>	1	interest	2	
)	1	principal	2	
{	1	rate	2	
float	2	time	2	
=	2	100	2	
(	2	interest	3	
*	2	0	4	
*	2			
)	2			
/	2			
;	2			
return	3			
;	3			
}	4			
else	4			
{	4			
return	5			
;	5			
}	6			

Measure	Symbol	Formula
Program length	N	N= N1 + N2
Program vocabulary	n	n= n1 + n2
Volume	V	V= N * (LOG2 n)
Difficulty	D	D= (n1/2) * (N2/n2)
Effort	E	E= D * V
Time	T	(E / 18) sec
Num Bugs	B	V / 3000

N1 Count = 23	**N2 Count = 11**
n1 Count = 14	**n2 Count = 6**

2.1. Program vocabulary (n) = 14+6 = 20

2.2. Program length (N) = 23+11 = 34

2.3. Program volume (V) = 34*(LOG 20) = 146.88

2.4. Program difficulty (D) = (14/2)*(11/6) = 12.83

2.5. Program effort (E) = D*V =146.88*12.83= 1,884.47

Task 3: Compute the final FP (2x3 = 6 points)

Lines of Code per Function Point by Languages
2009 by Quantitative Software Management

Language	Avg	Median	Low	High
Assembler	209	203	91	320
Ada	154	-	104	205
C	148	107	22	704
C++	59	53	20	178
C#	58	59	51	66
COBOL	80	78	8	400
FORTRAN	90	118	35	-
HTML	43	42	35	53
Java	55	53	9	214
JavaScript	54	55	45	63
VBScript	38	37	29	50
Visual Basic	50	52	14	276

3.1. Compute the final FP for a system with EI=8, EO=7, EInq=5, ILF=3, and EIF=5, all of average complexity with VAF totaling 35. Compute the estimated code size in Java.

Solution:

FP=(8×4)+(7×5)+(5×4)+(3×10)+(5×7)

FP=32+35+20+30+35=**152**

Final FP=FP×(0.65+0.01×VAF)

Final FP=152(0.65+0.01×35) = **152**

Estimated code size in Java = 152×55 **= 8,360 lines of code**

3.2. Compute the final FP for a system with EI=70:complex, EO=85:average, EInq=103:simple, ILF=85:average, EIF=40:complex, with VAF totaling 25. Compute the estimated code size in Cobol.

Solution:

- **EI (70 Complex)**: Each EI of complex complexity has a weight of **6**.
  70×6=42070 \times 6 = 42070×6=420
- **EO (85 Average)**: Each EO of average complexity has a weight of **5**.
  85×5=42585 \times 5 = 42585×5=425
- **EInq (103 Simple)**: Each EInq of simple complexity has a weight of **3**.
  103×3=309103 \times 3 = 309103×3=309
- **ILF (85 Average)**: Each ILF of average complexity has a weight of **10**.
  85×10=85085 \times 10 = 85085×10=850
- **EIF (40 Complex)**: Each EIF of complex complexity has a weight of **10**.
  40×10=40040 \times 10 = 40040×10=400

FP=420+425+309+850+400=2,404
Final FP=FP*(0.65+0.01×VAF)
Final FP=2,404×(0.65+0.01×25) = 2163.6

Rounding off gives
Final FP = 2164

Estimated code size = 2164*80 = **173,120 Lines of Code**