8. Effort Estimation and Scheduling:

Timeline-1:

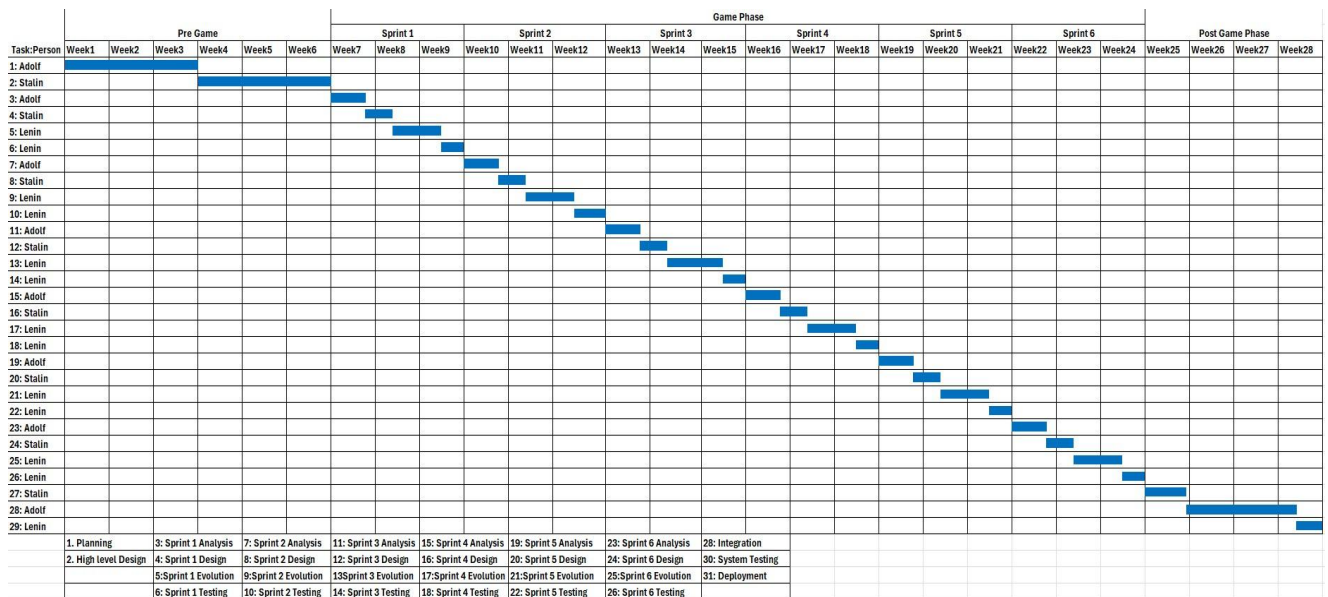$Considering, source\ line\ of\ code = 8000,$

$$Effort = PM = Coefficient_{<Effort\ Factor>} \times \left(\frac{SLOC}{1000}\right)^P = 2.4 \times \left(\frac{6000}{1000}\right)^{1.05} = 15.749$$

$Development\ time = DM = 2.50 \times (PM)^T = 2.50 \times (15.749)^{0.38} = 7.127\ months$

$required\ weeks = 7.127 \times 4 = 28.508 \cong 28\ weeks$

$$required\ number\ of\ people = ST = \frac{PM}{DM} = \frac{15.749}{7.127} = 2.21 \cong 3$$

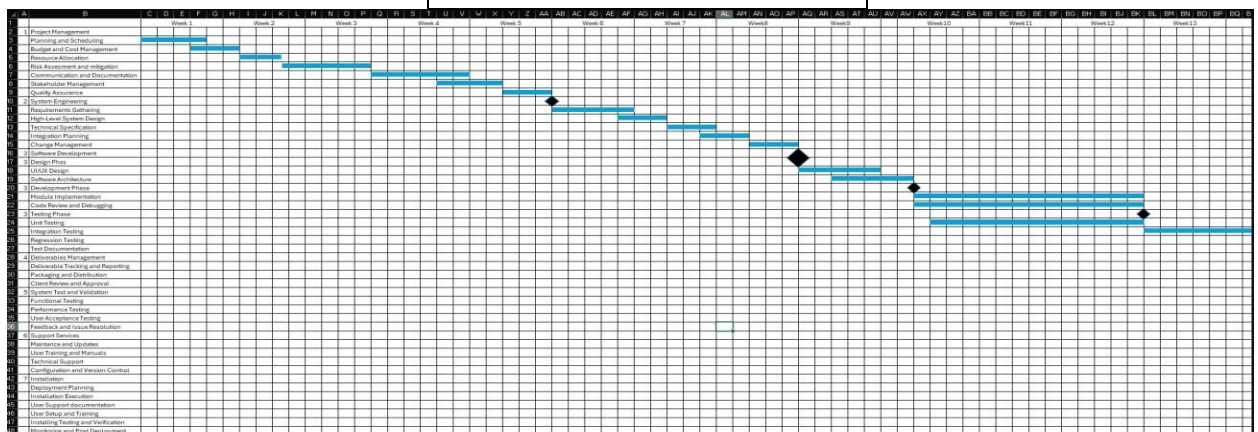So, 3 people will be needed, They are Adolf, Stalin and Lenin

Fig 36: Timeline - 1

Timeline-2:

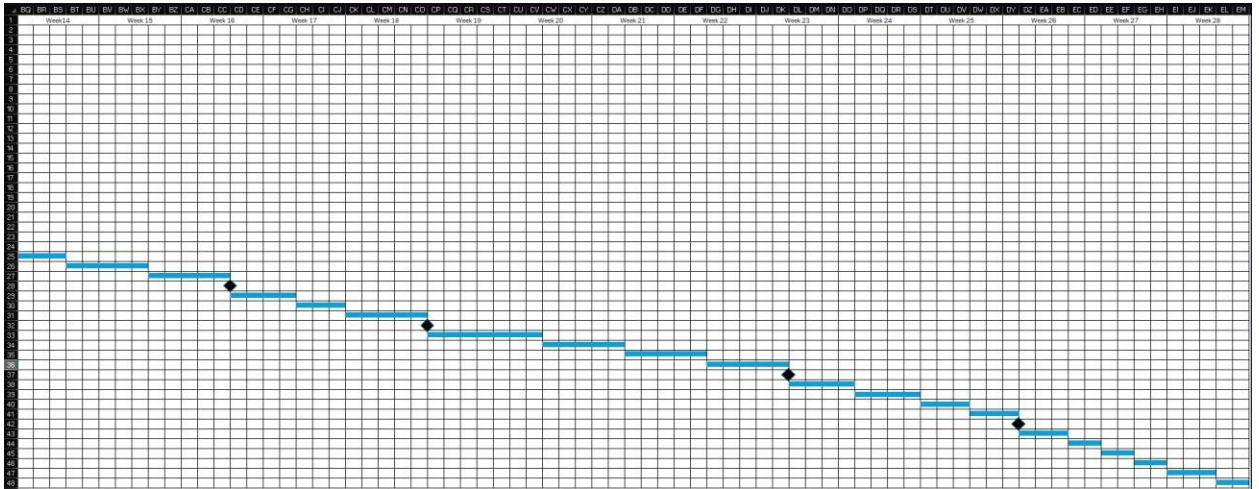Fig 37: Timeline-2

Fig 38: Timeline -2

Earned Value Analysis (EVA):

Task	Planned Effort	Actual Effort
1	5.0	2.0
2	8.5	5.5
3	3.0	5.0
4	2.0	4.5
5	5.5	5.5
6	2.5	3.0
7	4.5	4.0
8	9.0	7.0
9	1.0	-
10	3.5	-

$$BAC = 28 \times 5 = 140 \; person \; days$$

$$SPI = \frac{BCWP}{BCWS} = \frac{40}{44.5} = 0.8989$$

$$SV = BCWP - BCWS = 40 - 44.5 = -4.5 \; person \; days$$

$$CPI = \frac{BCWP}{ACWP} = \frac{40}{36.5} = 1.0959$$

$$CV = BCWP - ACWP = 40 - 36.5 = 3.5 \; person \; days$$

$$\% \; schedule \; for \; completion = \frac{BCWS}{BAC} = \frac{44.5}{140} = 31.7857\%$$

$$\% \; complete = \frac{BCWP}{BAC} = \frac{40}{140} = 28.5714\%$$

9. Risk Management

Risks	Category	Probability	Impact	RMMM
Poorly defined requirements	Process Definition (PR)	60%	2	Multiple meetings with the customer and stakeholders to improve requirements
Over-optimistic scheduling	Process Definition (PR)	50%	2	Proper mathematical calculation and assumption for time scheduling
Resistance to change by stakeholders	Customer Characteristics (CU)	50%	3	Change control, incremental development
Insufficient testing time	Development Environment (DE)	70%	2	Allocate sufficient time for testing and create test plans, create more comprehensive test cases.
Miscommunication between teams	Staff Size and Experience (ST)	55%	3	improve communication channels and conduct regular team meetings
Technology integration issues	Technology to be Built (TE)	40%	2	Conduct integration testing and use modular design approaches
Lack of domain expertise	Staff Size and Experience (ST)	50%	2	Technical analysis, cost-benefit analysis, prototyping, training

End user resist system	Business Impact (BU)	40%	3	User training, involvement, feedback.
Inadequate documentation	Development Environment (DE)	60%	2	Ensure proper documentation guidelines, review after every update on logfile
Unstable development environment	Development Environment (DE)	35%	2	Stabilize and monitor the development
				environment, provide required utilities.
Unanticipated hardware failure	Technology to be Built (TE)	25%	1	Invest in hardware redundancy and monitoring systems
Data security vulnerabilities	Technology to be Built (TE)	40%	1	Conduct regular security audits and implement best practices