



# **American International University-Bangladesh (AIUB)**

**Faculty of Science and Technology (FST)  
Department of Computer Science (CS)**

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**Project Title: E-sports Tournament Management System  
Section: B**

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# ***1 Introduction:***

## ***1.1 Document Intention:***

This document outlines the project scope, objectives, and key functionalities of the "Esports Tournament Management System" software. It serves as a comprehensive reference for stakeholders involved in the project's development and implementation.

## ***1.2 Target Audience:***

This document is primarily intended for:

- **Project Team:** Developers, designers, testers, and other individuals directly involved in building and deploying the software.
- **Stakeholders:** Clients, investors, and executives seeking an overview of the system's functionality and goals.
- **Users:** Tournament organizers, players, judges, and monitors interacting with the system.

## ***1.3 Document Objectives:***

This document aims to:

- Clearly define the vision and purpose of the Esports Tournament System.
- Explain the key functionalities and features of the system.
- Describe the target users and their roles within the system.
- Outline the project goals and expected outcomes.
- Establish a roadmap for development and implementation.
- Provide a basis for future communication and collaboration between stakeholders.

# ***2 Project Title***

E-Sports Tournament Management System (ETMS)

# ***3 Objectives:***

## ***3.1 Overall Objectives:***

The overarching goal of the E-Sports Tournament Management System (ETMS) is to provide a comprehensive, user-friendly, and efficient platform that facilitates the seamless organization, management, and execution of e-sports tournaments across various gaming titles. The system aims to enhance the tournament experience for players, organizers, and stakeholders involved in the e-sports community.

### 3.2 Objectives:

- i. **User Registration and Team Creation:**
  - *Sub-objective 1:* Allow players to register accounts on the platform.
  - *Sub-objective 2:* Enable players to create teams with their friends or join existing teams.
  - *Sub-objective 3:* Implement a secure and user-friendly account management system.
- ii. **Tournament Registration:**
  - *Sub-objective 1:* Provide a list of available tournaments for players to choose from.
  - *Sub-objective 2:* Allow teams to register for selected tournaments.
  - *Sub-objective 3:* Implement a payment system for tournament registration fees.
- iii. **Tournament Organization:**
  - *Sub-objective 1:* Develop a scheduling system for tournaments.
  - *Sub-objective 2:* Enable organizers to promote events and push branding.
  - *Sub-objective 3:* Facilitate the management of prize pools for each tournament.
- iv. **Team Qualification and Selection:**
  - *Sub-objective 1:* Implement a qualification process for registered teams.
  - *Sub-objective 2:* Provide tools for the management team to evaluate and select qualified teams.
  - *Sub-objective 3:* Communicate the qualification results to the registered teams.
- v. **Tournament Hosting:**
  - *Sub-objective 1:* Develop features for hosts to create and set up tournaments.
  - *Sub-objective 2:* Implement tools for hosts to monitor and manage ongoing tournaments.
  - *Sub-objective 3:* Ensure a smooth and reliable hosting experience for organizers and participants.
- vi. **Game Monitoring and Ranking:**
  - *Sub-objective 1:* Set up a system for the judging team to monitor gameplay during tournaments.
  - *Sub-objective 2:* Implement a scoring and ranking system for players and teams.
  - *Sub-objective 3:* Provide real-time updates on tournament progress and results.
- vii. **User Experience and Interface:**
  - *Sub-objective 1:* Design a user-friendly interface for easy navigation.
  - *Sub-objective 2:* Ensure responsive and accessible design for a diverse user base.
  - *Sub-objective 3:* Implement feedback mechanisms for users to report issues or suggest improvements.
- viii. **Security and Data Protection:**
  - *Sub-objective 1:* Implement robust security measures to protect user data and financial transactions.
  - *Sub-objective 2:* Ensure compliance with data protection regulations.
  - *Sub-objective 3:* Regularly update and monitor the system for potential security vulnerabilities.

## 4 Justification:

### 4.1 Purpose Of the System:

The primary purpose of the ETMS is to revolutionize the management and organization of e-sports tournaments. By providing a centralized, feature-rich platform, it aims to streamline and automate the entire tournament lifecycle,

from registration and team creation to event hosting and result tracking. The system's core purpose is to enhance efficiency, accessibility, fairness, and overall user experience within the e-sports tournament ecosystem.

## ***4.2 Justification:***

Nowadays the number of e-sports players in Bangladesh is gradually increasing. but there are no e-sports management systems. As there is no e-sports management system in our country our esports players are not getting good opportunities in the esports sector. And the esports industries did not grow up more. So, our players use the sports management system of other countries. As a result, they pay a huge amount of money as registration fees to those countries. We want to develop an e-sports management system so that our players can easily use this system, and our country can profit from it. It also can increase the availability of our local players. Our project objective is to develop esports management software, through this software esports players get more opportunities in the esports industry. since our region is far behind in the esports sector. So, we think that through this software our esports industry will grow more. Our country's esports players are not getting good opportunities in the esports sector, lacking a good esports management system. So, we are trying to develop an e-sports management system. Online gamers are the main target of this system. It can enrich the e-sports community, which can help the gamers' community.

E-sports is a new sector and other countries are already keeping pace with it. At present the esports industry has grown a lot in other countries. but our region is lagging in this sector. because our e-sports sector has not developed with others. Due to a lack of an esports management system. Therefore, esports players are not getting such good opportunities. So, our esports industry is lagging. That's why we need to develop e-sports management software to solve the problem. With the help of the system, the e-sports industry will grow more in our region and the huge number of e-sports players will get more opportunities to play more games. So, the e-sports player will benefit from this software.

## ***4.3 Beneficiaries:***

### **4.3.1 Players and Teams:**

Players gain easy access to a platform where they can register for tournaments, form teams, and compete in their preferred e-sports titles. Simplified registration and team management processes enable players to focus more on gameplay and less on administrative tasks. The system ensures fair team selections, qualifications, and result evaluations, enhancing trust and integrity among participants.

### **4.3.2 Tournament Organizers:**

Organizers benefit from streamlined event management tools, simplifying tasks related to scheduling, promotion, and communication with participants. The platform offers opportunities for organizers to enhance their brand visibility and promote their tournaments to a wider audience. Access to comprehensive data and analytics empowers organizers to make informed decisions for future events and improvements.

### **4.3.3 Spectators and E-Sports Community:**

Spectators can easily follow tournaments, view match schedules, and track results, fostering a more engaged and informed e-sports audience. A well-organized and efficient tournament system contributes to the growth of the e-sports community, attracting more participants and enthusiasts.

#### **4.3.4 Sponsors and Partners:**

Sponsors gain increased exposure and engagement by associating with well-organized and widely accessible tournaments hosted through the system. Access to a diverse and engaged audience allows sponsors to target their marketing efforts effectively.

## **5 *Systems Overview:***

### **5.1 *Overview Of the System:***

The e-sports tournament management system mainly manages the whole system of an e-sports tournament. When a player or team wants to play a tournament, they can register through this system. The player can choose the tournament. A player can create a team with his friend. And the organizer's team maintains the tournament and ranking. esports tournament Management software grants users the ability to organize and comprehensively manage eSports events. Tournament organizers use eSports management software to schedule and promote events, push branding, handle user registration, run competitions, facilitate prize pools, and more. The esports player can play tournaments throughout this system. Every esports game is mainly played by a group-wise, 6 members or 5 members team participates in a tournament. So, all players must sign up for an account then he/she can register for the tournament. For the registration 1 player submits all group member information. The players pay the registration fee. The registration procedure controls the registered team. When the registered team confirms the team for the registration then the management team selects the team qualification-wise. Then the host management hosted the tournament. And the judging team monitors the game and ranks the players.

## 5.2 Use case Diagram:

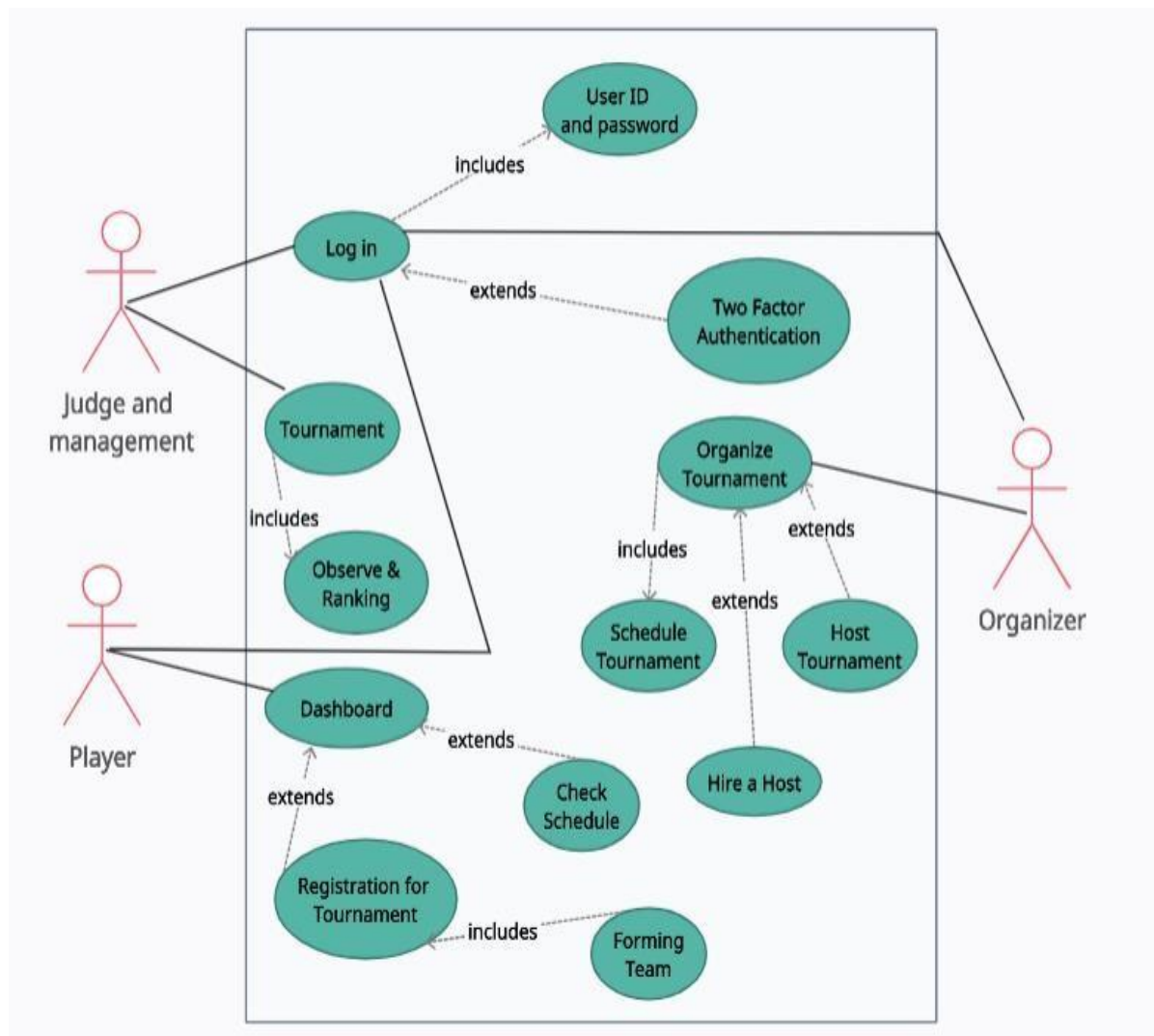


Figure 1: Use Case Diagram

## 6 Stakeholders:

Stakeholder Group	Positive/Negative	Primary/Secondary	Internal/External	Influence Level
Players	Positive	Primary	External	High
Teams	Positive	Primary	External	High



<b>Organizers</b>	Positive	Primary	External	High
<b>Hosts</b>	Positive	Primary	External	Medium
<b>Judging Team</b>	Positive	Primary	External	Medium
<b>Sponsors</b>	Positive	Primary	External	High
<b>Developers</b>	Positive	Secondary	Internal	High
<b>Spectators</b>	Positive	Secondary	External	Low
<b>Governing Bodies</b>	Positive	Secondary	External	Medium
<b>Media Outlets</b>	Positive	Secondary	External	Medium
<b>Advertisers</b>	Positive	Secondary	External	Medium
<b>Educational Institutions</b>	Positive	Secondary	External	Medium
<b>Governments/Regulatory Authorities</b>	Positive/Negative	Secondary	External	Low
<b>Guardians</b>	Negative	Secondary	External	Low
<b>Vendors</b>	Positive	Secondary	External	Low
<b>Suppliers</b>	Positive	Secondary	External	Low

Table 1: Stakeholder Table

## 7 Feasibility Study:

### 7.1 Technical Feasibility:

The system is designed to operate on standard personal computers and mobile devices. Compatibility testing across various devices and operating systems (Windows, macOS, Linux, iOS, Android) confirms feasibility. The system leverages well-established technologies like HTML5, CSS3, JavaScript for the frontend, .NET Core and PHP for backend development, ensuring compatibility, security, and scalability across platforms. The use of Microsoft SQL Server for database management provides robustness and scalability necessary to handle tournament data and user interactions. The system architecture is designed to accommodate increased user loads during peak tournament

hours, ensuring scalability through load balancing and optimized server configurations. The system supports integration with external gaming platforms and APIs, enabling real-time data synchronization and updates.

Technical feasibility analysis indicates that the proposed system aligns well with available technology, infrastructure, and software requirements, ensuring it can be effectively developed and implemented.

## ***7.2 Financial Feasibility:***

The initial development costs include hiring developers, software licensing fees, and infrastructure setup, estimated at 4,540,000 BDT. The client has agreed to pay the required estimated budget to develop the system as the revenue sources align with the operational costs, ensuring financial sustainability post-implementation. So, The E-sports Tournament Management System is financially feasible.

## ***8 Systems Components:***

- i. **User Management:**
  - User registration and account management.
  - Player profile creation and customization.
  - Team creation, joining, and management.
- ii. **Tournament Registration and Management:**
  - List of available tournaments with details.
  - Team registration for tournaments.
  - Tournament scheduling and organization.
  - Payment integration for registration fees.
- iii. **Qualification and Selection:**
  - Team qualification process.
  - Evaluation tools for the management team.
  - Communication of qualification results.
- iv. **Tournament Hosting:**
  - Creation and setup of tournaments by hosts.
  - Monitoring tools for ongoing tournaments.
  - Communication channels for hosts and participants.
- v. **Gameplay Monitoring and Ranking:**
  - Live monitoring of gameplay during tournaments.
  - Scoring and ranking system for players and teams.
  - Real-time updates on tournament progress and results.
- vi. **Communication and Notifications:**
  - In-app messaging for teams and organizers.
  - Notification system for important updates (e.g., tournament start times, qualification results).
- vii. **User Interface and Experience:**
  - Intuitive and user-friendly design.
  - Responsive and accessible interface.
  - Dashboard for easy navigation and information access.
- viii. **Branding and Promotion:**
  - Tools for organizers to promote events.
  - Customization options for tournament branding.
  - Publicity features to attract participants and sponsors.
- ix. **Prize Pool Management:**
  - Facility for organizers to set up prize pools.
  - Automated distribution of prizes to winners.
  - Financial tracking for tournament-related transactions.
- x. **Security and Compliance:**

- Secure user authentication and data protection.
- Compliance with data protection regulations.
- Regular security audits and updates.

## ***9 Process Model:***

We chose the DSDM process model for our project. DSDM (Dynamic system development method) process model allows us to complete the project faster than the other process models. One of the main features of DSDM is flexibility. To develop our project, we chose DSDM because it fits our project requirements. Our project is an e-sports tournament management system. So, our project needs to be updated from time to time. DSDM process model allows us to deliver faster (4-6 months). We want to complete our project in 4-5 months. DSDM also allows us to form a project team of around 5 members. Project completion percentage of DSDM is also high. We may need to add some new requirements in the development phase's DSDM allows us to do that.

There are many other software development process models besides DSDM. such as waterfall, V model, FDD, SCRUM. We did not choose the waterfall model as we cannot backtrack in this model. As a result, we cannot add new requirements in development time. FDD is used to develop large software like banking related software or simulation base software like MATLAB, Multisim. But our proposed project is not a large project so we can't choose FDD. No more items and issues can be found, nor can any new ones be invented in the post-game phase of scrum. That's why we did not choose scrum process model.

So, we chose the DSDM process model. In DSDM process model Functional/requirement varies. Time & resources are fixed.

## ***10 Efforts Estimation:***

To estimate the required effort, we need to breakdown the project into its component parts. We use the Work Breakdown structure (WBS) to break down the entire project into smaller components.

## 10.1 Work Breakdown Structure (WBS):

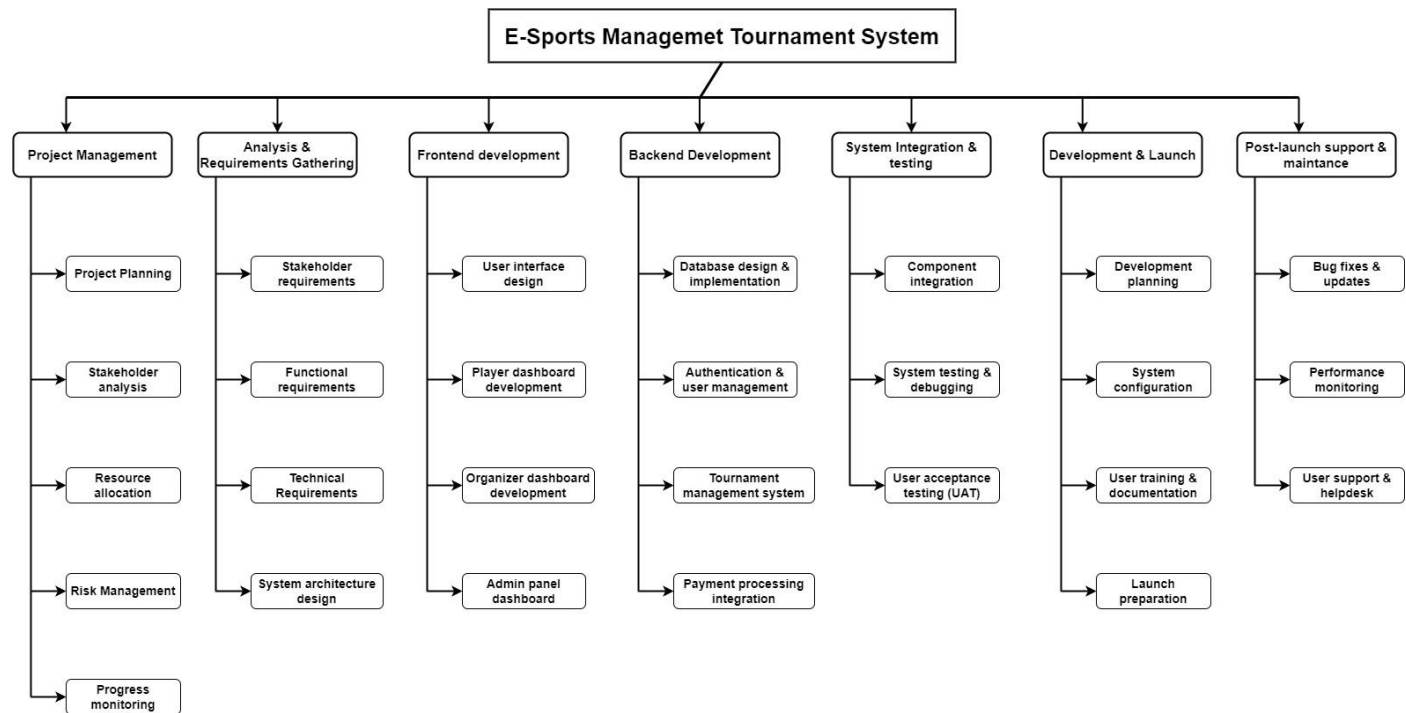


Figure 2: Work Breakdown Structure

## 10.2 Estimation Using COCOMO (Constructive Cost Model):

We assumed that as per our project requirement the source code can be 18000 lines.  
So, our SLOC = 18000

So, we can find out how much time and how many people are required for complete this project by COCOMO Rule

SLOC = 18000

Coefficient = 2.4

Project complexity, P = 1.05

SLOC-dependent coefficient, T = 0.38 (for Organic type)

Effort = PM = Coefficient<Effort Factors>  $\times (SLOC/1000)^P$

$= 2.4 \times (18000/1000)^{1.05}$

$= 49.92$

$\cong 50$

Development time = DM =  $2.50 \times (PM)^T$

$= 2.50 \times (PM)^{0.38}$

$= 11 \text{ Months}$

Required number of people,  $ST = PM / DM$

$$= 50/11$$

$$= 4.55$$

$$\cong 5$$

So, we need 11 months (44 weeks) and 5 members for development this software.

### 10.3 Gantt Chart

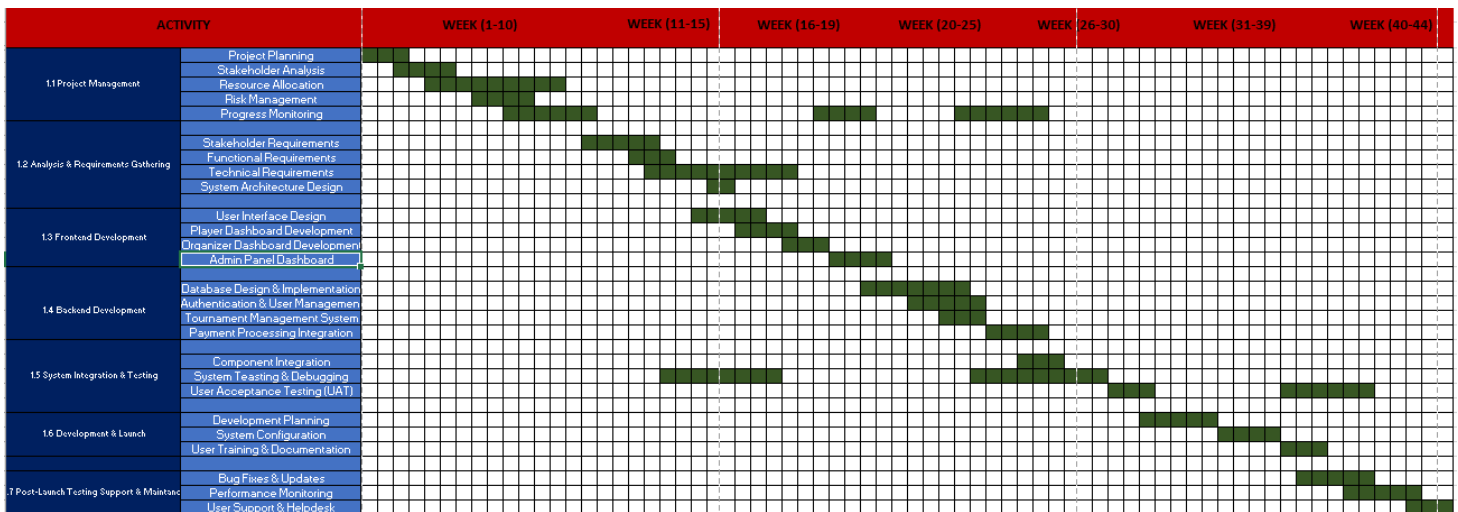


Figure 3:Gantt Chart

### 11 Activity Diagram:

Activity	Duration (Weeks)	Precedents
<b>A: Project Planning</b>	3	-
<b>B: Requirements Gathering</b>	4	A
<b>C: UI/UX Design</b>	7	A, B
<b>D: Backend Development</b>	9	B
<b>E: Frontend Development</b>	9	C
<b>F: System Integration</b>	7	D, E
<b>G: Testing &amp; Debugging</b>	5	F
<b>H: User Acceptance Test</b>	4	G
<b>I: Deployment</b>	3	H

**J: Post-Launch Support**

2

I

Table 2: Activity Table

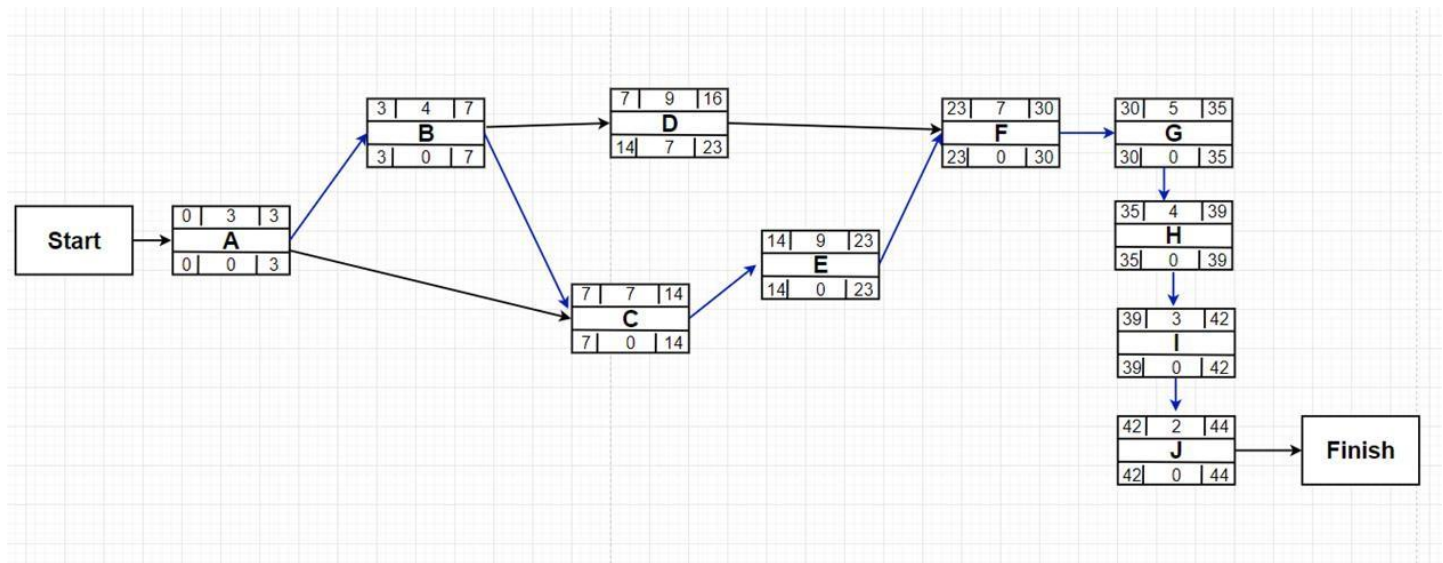


Figure 4: Precedence Activity Network Diagram

From precedence diagram, the paths are:

**Path 1:** A-B-D-F-G-H-I-J =  $3+4+9+7+5+4+3+2 = 37$  weeks

**Path 2:** A-B-C-E-F-G-H-I-J =  $3+4+7+9+7+5+4+3+2 = 44$  weeks

**Path 3:** A-C-E-F-G-H-I-J =  $3+7+9+7+5+4+3+2 = 20$  weeks

**Critical Path:** Here path 2 (A-B-C-E-F-G-H-I-J) is the critical path which has longest duration of 44 weeks to completion of the project.

## 12 Risk Analysis:

Ref	Hazard	Likelihood	Impact	Risk Exposure	Mitigation Plan
R1	Unrealistic time estimate	4	7	28	Take two weeks to sign the agreement even if the projects could be completed in one week.
R2	Key staff ill at critical times in the project	7	6	42	Overtime or adding an expert to the project team may be the answer.
R3	Fault in reusable software component	5	8	40	If this occurs, it has a financial impact. Take some extra cash from the customer when signing the agreement

<b>R4</b>	It is impossible to recruit all staffs with the skill required for the project	6	7	42	Create a team that combines expertise and inexperience.
<b>R5</b>	Late change to requirement from customer	3	5	15	Include a clause in the contract that allows for changes to be made but with additional time or cost implications.
<b>R6</b>	Delivery deadline gets late	2	8	16	Build in a buffer period of 10% of the total project duration into the original schedule.

Table 3: Risk Analysis Table

## 13 Budget:

### 13.1 Developer Costs

Project development time = 11 Months

Number of developers will work = 5

Working days= 5 Day

Working hour per day= 8 Hours

Working hour in 1 week= (5\*8) = 40 Hours

Charge for each developer per hour = 300 TK

Charge for each developer

Per week = (300\*40) = 12,000 TK

For a month = (12000\*4) = 48,000 TK

For 11 months = (48000\*11) = 528,000 TK

Charge for 6 developers for 11 months = (528,000 \* 5) = 2,640,000 TK

**Total Developer Cost: 2,640,000 TK**

### 13.2 Management and Other Employee Costs

Project manager charge for 11 months = (11\*60000) = 660,000 TK

Other employees charge for 11 month = 300,000 TK

**Total Management Cost: 960,000 TK**

### ***13.3 Infrastructure Costs***

Office rent for 11 months=  $(11 * 30000) = 330,000$  TK

Server and Hosting for 1 years = 200,000 TK

Electricity and other bills = 200,000 TK

**Total infrastructure Cost: 730,000 TK**

### ***13.4 Software and Licensing***

Development Tools = 60,000 TK

Third-Party APIs = 100,000 TK

Software Licenses = 50,000 TK

**Total Software and Licensing Cost: 210,000 TK**

### ***13.5 Total Estimated Budget***

$$\begin{aligned}\text{Total Estimated Cost} &= \text{Developer Cost} + \text{Management Cost} + \text{Infrastructure Cost} + \text{Software/Licensing Cost} \\ &= 2,640,000 \text{ TK} + 960,000 \text{ TK} + 730,000 \text{ TK} + 210,000 \text{ TK} \\ &= 4,540,000 \text{ TK}\end{aligned}$$

**Total Estimated Budget: 4,540,000 TK**

## ***14 Conclusion:***

Throughout the course of this document, a comprehensive overview of the system's objectives, feasibility, stakeholders, budget, and essential components has been presented. The system aims to offer an intuitive and robust platform that streamlines tournament registration, team management, event scheduling, and result monitoring. The feasibility analysis, both technical and financial, underscores the system's viability and adaptability. Leveraging state-of-the-art technologies and strategic financial projection, the system not only promises seamless functionality but also ensures scalability and sustainability in the ever-evolving landscape of esports.