Reddit Clone Implementation Report

Project Overview

This report details the implementation of a Reddit clone system utilizing a REST API architecture for client-server communication. The project implements core Reddit functionality including user registration, forum management, posting, commenting, voting, and direct messaging.

Team Members

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Demo Link

https://www.youtube.com/watch?v=RSbL_fuPvZ8&feature=youtu.be

System Architecture

Components

REST API Server (server.go)

- Handles HTTP requests using the Gorilla Mux router
- Implements CORS and logging middleware
- Routes requests to appropriate engine handlers
- Response standardization using common Response struct

Social Engine (social_engine.go)

- Core business logic implementation
- Actor-based concurrency using Proto Actor framework
- In-memory data structures for users, forums, posts, and messages
- Thread-safe operations using mutex locks

REST Client (rest_client.go)

- Command-line interface for interacting with the server
- Supports all core Reddit functionalities
- Handles JSON serialization/deserialization
- Configurable timeout settings

Protocol Definitions (messages.proto)

- Protocol Buffer definitions for all message types

- Structured data models for content, feedback, and chat
- Clear separation between request and response messages

Key Design Patterns

Actor Model

- Uses Proto Actor for concurrent message handling
- Ensures thread safety for shared state
- Enables scalable message processing

Repository Pattern

- Centralized data management in SocialEngine
- Clean separation of concerns
- Consistent data access patterns

Core Functionality Implementation

User Management

```
func (s *Server) registerUser(w http.ResponseWriter, r *http.Request) {
    // User registration implementation
}
```

- Simple username-based registration
- Unique username validation
- Activity status tracking

Forum Operations

- Forum creation with name and description
- Join/leave forum functionality
- Member tracking and forum statistics
- Forum content feed management

Content Management

- Post creation with title and body
- Hierarchical comment system
- Content ID generation for unique identification
- Support for reposting/sharing content

Voting System

- Upvote/downvote functionality
- Points calculation
- User karma tracking
- Hot score computation for content ranking

Direct Messaging

- User-to-user messaging
- Message status tracking (seen/unseen)
- Message retrieval with pagination
- Real-time message delivery

Running Multiple Clients

Setup Instructions

1. Start the server:

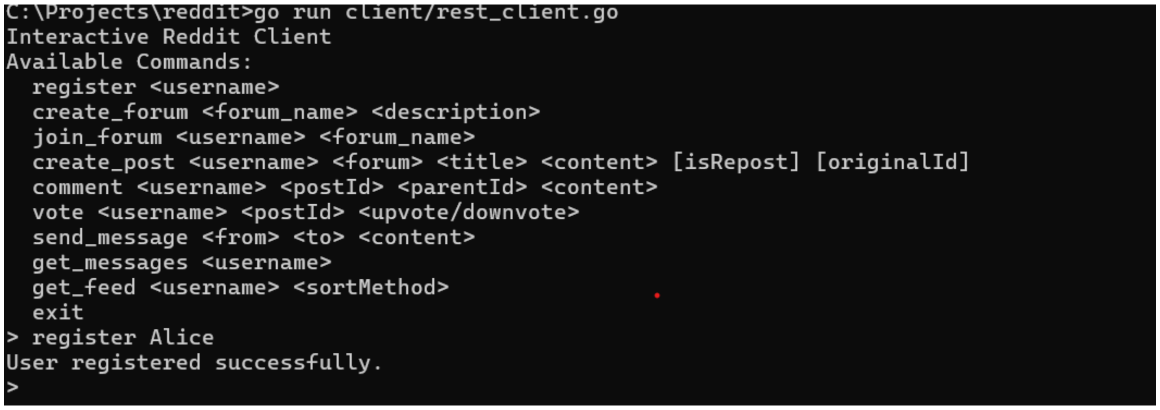
   go run cmd/server/main.go -port 8080 -actor-port 8085

2. Start multiple client instances:

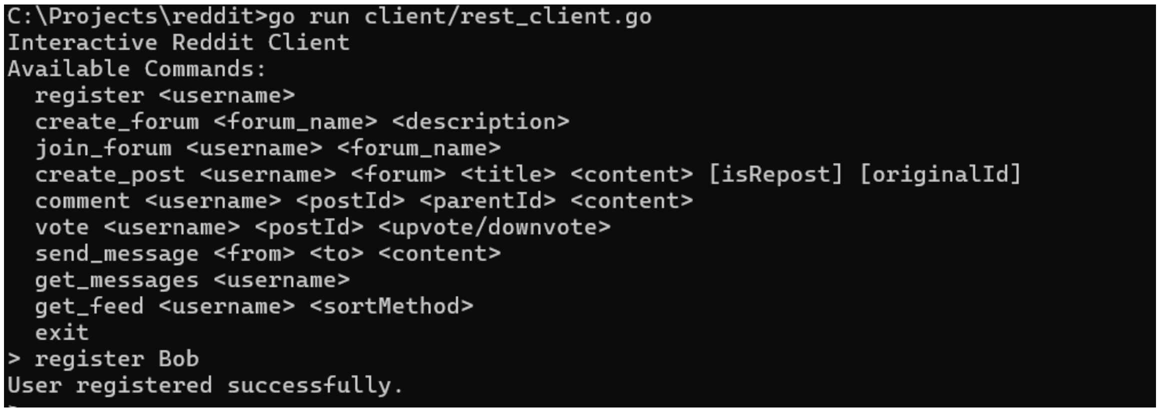
   go run client/rest_client.go

Testing Multiple Client Interactions

1. User Registration



```
C:\Projects\reddit>go run client/rest_client.go
Interactive Reddit Client
Available Commands:
  register <username>
  create_forum <forum_name> <description>
  join_forum <username> <forum_name>
  create_post <username> <forum> <title> <content> [isRepost] [originalId]
  comment <username> <postId> <parentId> <content>
  vote <username> <postId> <upvote/downvote>
  send_message <from> <to> <content>
  get_messages <username>
  get_feed <username> <sortMethod>
  exit
> register Alice
User registered successfully.
>
```



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C:\Projects\reddit>go run client/rest_client.go
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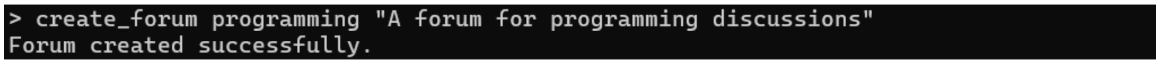
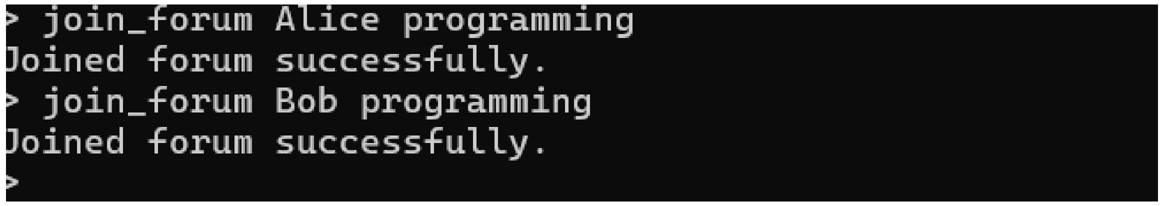
  comment <username> <postId> <parentId> <content>
  vote <username> <postId> <upvote/downvote>
  send_message <from> <to> <content>
  get_messages <username>
  get_feed <username> <sortMethod>
  exit
> register Bob
User registered successfully.
>
```

2. Forum Creation and Joining

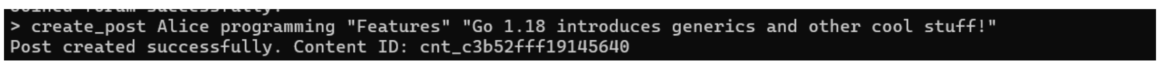


```
> create_forum programming "A forum for programming discussions"
Forum created successfully.
```



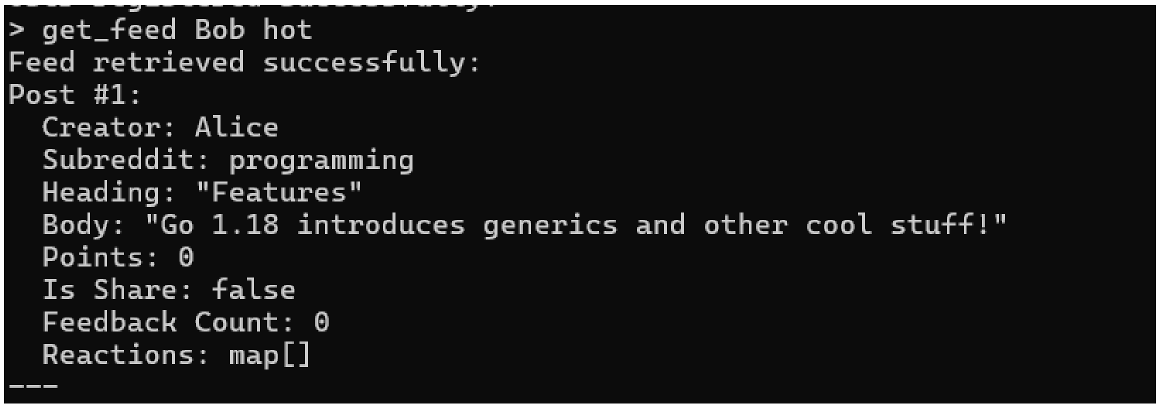
```
> join_forum Alice programming
Joined forum successfully.
> join_forum Bob programming
Joined forum successfully.
>
```

3. Create Post



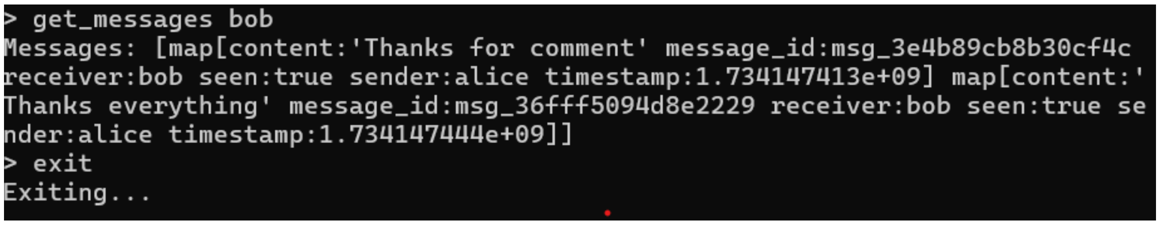
```
> create_post Alice programming "Features" "Go 1.18 introduces generics and other cool stuff!"
Post created successfully. Content ID: cnt_c3b52fff19145640
```

4. Get Feed



```
> get_feed Bob hot
Feed retrieved successfully:
Post #1:
  Creator: Alice
  Subreddit: programming
  Heading: "Features"
  Body: "Go 1.18 introduces generics and other cool stuff!"
  Points: 0
  Is Share: false
  Feedback Count: 0
  Reactions: map[]
---
```

5. Exit



```
> get_messages bob
Messages: [map[content:'Thanks for comment' message_id:msg_3e4b89cb8b30cf4c
receiver:bob seen:true sender:alice timestamp:1.734147413e+09] map[content:'
Thanks everything' message_id:msg_36fff5094d8e2229 receiver:bob seen:true se
nder:alice timestamp:1.734147444e+09]]
> exit
Exiting...
```

Conclusion

The implemented Reddit clone successfully demonstrates core functionality with a clean separation between client and server components. The REST API provides a standardized interface for client-server communication, while the actor-based engine ensures thread-safe operations. The system supports multiple simultaneous clients and implements all required features including user management, content creation, voting, and direct messaging.