Network Programming (Net Centric Programming) – IT096IU
Term Project Description

Objectives:
To allow students to gain practical experience of the design, prototyping, testing, and evaluation stages of network application development.
To allow students to gain practical experience of using the TCP and UDP communications protocols at the programming level.
To strengthen the student's understanding of networking and communication issues by relating theory and practice.

Project Deliverables:
Source code and documentation must be submitted on blackboard before due. Zip all your file and name it Groupnumber_project.zip (ex: Group01_project.zip)
A demonstration session will be held at the end of the course. You will be asked to run through your program. Questions will be asked to verify your project source code
Fail to show up during the demonstration session or no demonstration at all will result in ZERO grading for project

Due date:
8:00 on demo day
Demo: starting 8:00 last lecture

Project Task: PokeCat n PokeBat
(wiki) Pokémon is a series of video games developed by Game Freak and Creatures Inc. and published by Nintendo as part of the Pokémon media franchise. First released in 1996 in Japan for the Game Boy, the main series of role-playing video games (RPGs) has continued on each generation of Nintendo's handhelds. Games are commonly released in pairs—each with slight variations—and then an enhanced remake of the games is released a few years after the original releases. While the main series consists of role-playing games, spinoffs encompass other genres, such as action role-playing, puzzle, and digital pet games. As of February 2016, more than 279 million units have been sold worldwide, more than 200 millions of which from the main series, making it the second best-selling video game franchise, behind only Nintendo's own Mario franchise. The franchise's mascot is Pikachu.
In this project, we will build a simple, text-based version of Pokemon game: PokeCat and PokeBat. There are two modules of the game Cat → Catching and Bat → Battling
Programming languages requirements: Python. You can use TCP, UDP for communication

Pokedex
Refer to the pokemon database website: www.pokedex.org to build up the pokemon database for our games (get base exp from http://bulbapedia.bulbagarden.net/wiki/List_of_Pok%C3%A9mon_by_effort_value_yield)
Pokemon database can be built using a web crawler. The pokemon database must be store in JSON file ***pokedex.json***
At least 2 pokemons for each type
Players store their captured pokemons in a pokemon list file, json format. This file contain information about the pokemon from pokedex.json as well as other info such as level, accumulated experience.
Leveling a pokemon:
- Pokemon earns exp points via pokebat (refer below)
- Pokemon need to double the accumulated exp at each level to gain next level
- All attributes, except speed and dmg_when_atked, will be re-calculated: old * (1 + EV). EV by default is 0.5. Bonus: EV can be randomized from 0.5 – 1 when server spawn pokemons (refer to PokeCat)
- A pokemon can be destroyed to give all its accumulated exp to a same type pokemon

PokeBat
The pokemon battle allows two persons to attend via network. Each player will pick 3 pokemons from their pokemon list to join a battle
Turn based battle
1st pokemon of 2 players who has higher speed will take 1st move

Player can switch pokemon during battle, turn will end after switching
Play must switch pokemon if the active pokemon got killed in battle
A pokemon attack will be randomly choose between normal attack and special attack
A special attack will have all elemental effects of a pokemon. Highest elemental damage will be applied to target pokemon
Normal attack: $DMG_A = ATK_A – DEF_B$
Special attack: $DMG_A = SP.ATK_A * ELEMENTAL\_MULTIPLY_B – SP.DEF_B$
$HP_B = HP_B – DMG_A$
One player can surrender a battle → other player will win automatically
Each pokemon of winning player will get 1/3 total of accumulated exp of all pokemons on the losing team

PokeCat

Pokeworld is a 1000x1000 (configurable) cells
Support multiple players on pokeworld. Player can join anytime
Player starts at a random coordinate. Player can move up/down, left/right one cell every second. Auto mode: set duration to run (i.e. 120 sec)
Server spawns pokemon every minute using pokedex, 50 (configurable) pokemons each wave, spawned pokemons have random level and random EV point (0.5-1). Pokemon will be despawned after 5 mins w/o being captured
When player in a cell that contains a pokemon → pokemon will be automatically captured
Player can have maximum 200 pokemons

Documentation:

- Architecture
- Format for player json data file
- Sequence diagram for main functions
- Instruction how to deploy and run your project

Grading:

- 20% of course grade
- Pokedex: 20 pts
- PokeBat: 40 pts
- PokeCat: 30 pts
- Document: 10 pts
- Bonuses: (additional info may be added to pokedex json format if needed)
    - Pokemon Evolve (5pts): refer to pokedex.org and go to pokemon individual page to see details. Example: Bulbasaur evolves into Ivysaur at level 16.
    - Other (10pts): introduce pokestops on pokeworld, pokestops contains pokeballs and berries. Pokeballs are used to catch pokemon, berries are used to revive death pokemons after battle. Particular game mechanics should be changed to adapt if applicable