# eSports for Engineers
## version 22041LTS

An award-winning strategy or engineering simulation game for each day of the week, free and easy to install on linux, no internet connection required to play.

Includes AI chess, go and contract bridge, poker, military simulations, multiplayer racing and flight sims that emphasize engineering precision.  In each game, intelligent computer opponents act like human players in that nothing is repetitive or scripted.

# The Problem

- Everything about linux is high quality – except the games that come with the distro

- I like solving a variety of math and tech puzzles – but all games on offer are simple first person shooters

- My game provider sells my personal information

- I like hard-core realistic games, not fantasy

- My employer pays me to stay in shape, but exercise bike is boring.  Is there a mental workout I can do along with my physical workout?

- I want to play graphical sims when I'm on a bus or train, but my laptop doesn't have a graphics card, just Intel internal graphics.

- I want an immersive, realistic and unscripted game that simulates the spiritual experience of being out in nature, that has depth and nostalgia.

# The Solution: eSports for Engineers

- Award-winning games, high quality Artificial Intelligence (AI) sparring partners, accurate physics

- A different simulation game for each day of the week.  (A simulation game, or sim, closely imitates real-world activities and environments.)

- Three of the sims are like time machines, in that they take place in an accurate and immersive historical setting.

- Free on linux, download as a single tar file

- Organized learning program to keep you motivated

- Quantitative and mathematical, includes classic strategy games and engineering simulation of real-world vehicles.

- Game suite can be installed and run on a PC with no internet access

- All sims run fine on an old laptop without a dedicated graphics card.

# If a suite of free classic Windows sims, repurposed to run on linux, is such a good idea, why hasn't it been done before?

- Challenge #1: Learning curve

  - Learning a classic sim is a big project, almost like learning a new language.  It's easy to get frustrated.

- Challenge #2: Installation

  - Many open source sims are developed and maintained by hundreds of enthusiasts over many years, leading to sprawling code bases, with essential utilities scattered across old internet forums.

  - Installing one such sim on an operating system it wasn't designed for is a challenge. This suite contains many old sims.

  - The MS Windows emulator for linux (wine) wasn't very capable until recently

# Solving challenge #1: Learning Curve

- A learning plan based on the science of learning
  - After each game, you do a detailed comparison of your performance vs. a gold standard. There is often an AI analyst to help with this. For example, after a chess game a world champion AI analyst points out your mistakes and suggest alternative ideas.
  - AI sparring partners are customized for you – strong enough to stretch your skills, human enough to keep the game exciting
  - In some games, such as Weiqi, an AI tutor watches your play and gives you immediate feedback via graphs and heatmaps
  - The learning plan is built around proven techniques such as interleaving, chunking, key principles first and storytelling (see "metaLearning.txt" for details.)

- OKRs
  - The Objectives and Key Results (OKR) technique is used throughout to keep you on track. (see "ObjectivesAndKeyResults_OKR.txt" for details.) OKR's are scored based on considerations such as mental muscles flexed (see "fourElementsOfMentalFunctioning.txt".

# Solving Challenge #2: Installation

- Prerequisite: in order to install esports-for-engineers, you must be familiar with linux command line.  Using terminal commands you'll be, e.g, executing scripts as in "./myScript.sh" and cutting and pasting sudo commands.  You'll also need to use the Ubuntu desktop graphics interface to, e.g., switch screens via <ALT> TAB, change desktop resolution and select to wake up apps that were minimized on the left sidebar.

- Install Ubuntu 22.04 LTS linux.  A fast computer is not required, and installation is straightforward.  Ubuntu 22.04 LTS installation on an old PC or laptop takes about half an hour.

- Run the script "./runThisScriptFirst.sh, which will tell you which commands to type into a terminal window in order to install required Ubuntu repository packages

- Download and unpack esports-for-engineers.tar.gz

- Run the launcher script, type ./launcher.py

eSports for Engineers

average score for last 7 days: 0

[1] MON: Contract Bridge
[2] TUE: Historical Sim Racing
[3] WED: Deep Learning Chess
[4] THU: Historical Flight/War Sim
[5] FRI: Deep Learning Weiqi
[6] SAT: Flight/War Sim (Advanced)
[7] SUN: Poker
[8] Export Scores and game output files
[9] Read Documentation
[10] Reset Scores
[11] Exit

Choose number listed above:

# A different computer sparing partner for each day of the week

**MON** former computer world Contract Bridge champion wBridge5

**TUE** Sir Isaac Newton, in the form of realistic Newtonian physics of a sim racing re-creation of dozens of Grand Prix races from the 1950's and 1960's era, when driver skill was the dominant factor in determining the winner

**WED** The deep learning program Leela Chess Zero, a clone of world Chess and Go champion Alpha Zero

**THU** Newton again, this time with the realistic physics of a flight and war simulation of a historical conflict from 1940 and 1950, at times when the aircraft were very difficult to fly and when pilot skill determined outcomes.

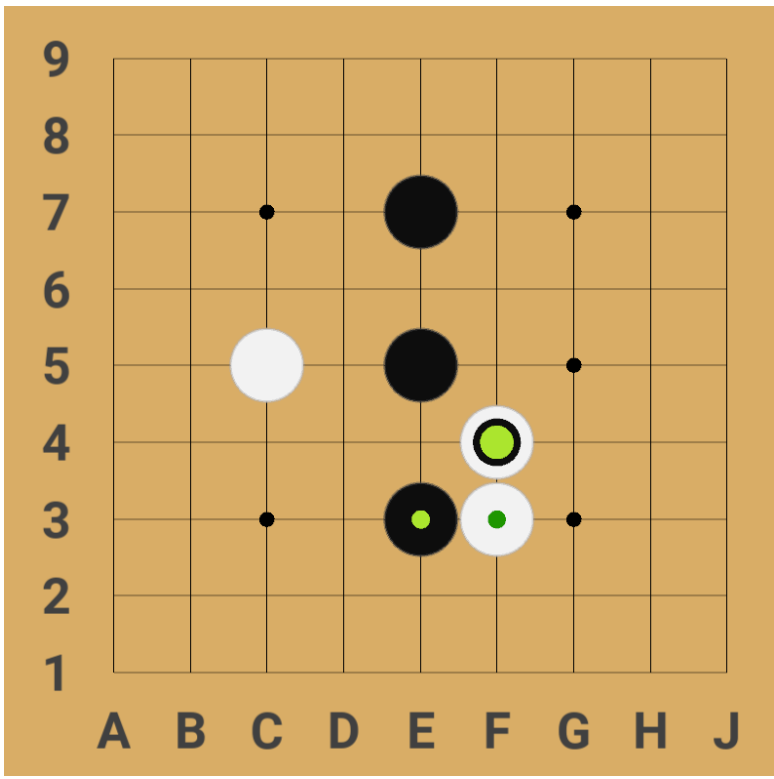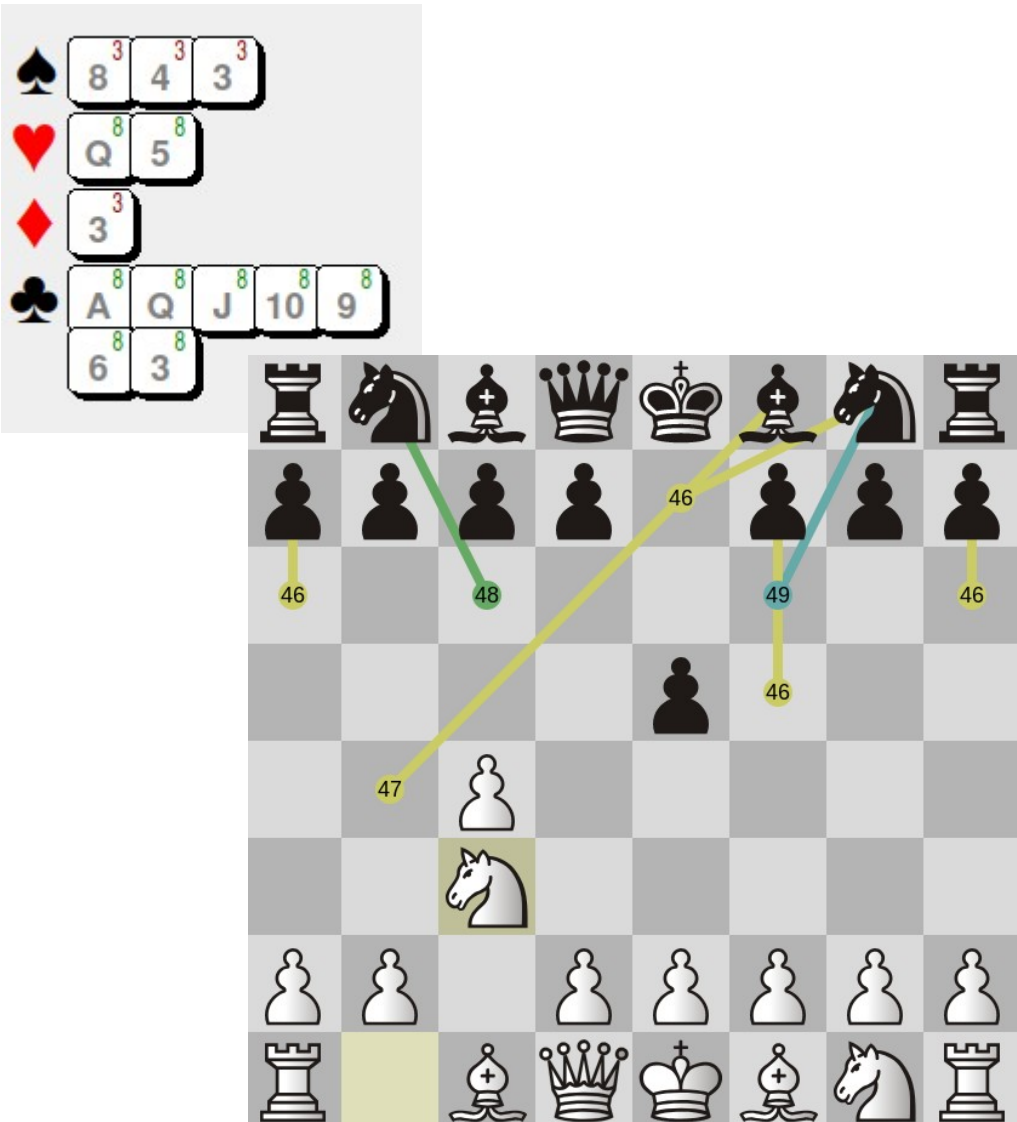**FRI** The KataGo clone of Alpha Zero, playing Go

**SAT** Opposing pilots and generals in flight and war simulations of historical Cold War era conflicts in the Middle East, the Balkans, Asia and Africa

**SUN** Several versions of Poker

The Grand Prix Legends (GPL) Demo provides more than 70 historically accurate race tracks and 9 sets of race cars . This immersive sim evokes the pageantry of F1 world championships from the 1950's and 1960's, an era when powerful, hard-to-control cars put a premium on driver skill. Most of these cars are overpowered open wheelers which rely on mechanical grip alone, i.e. without aerodynamic effects "clamping" cars to the ground. You see the suspensions working, feel the springs compressing, notice the differential working differently as you change its settings and sense the oversteer / understeer acutely as the cars respond to throttle, brake, pitch and yaw.

Open source versions of the world champion Alpha Zero programs for Chess and Go, configured for training and analysis, are included. Thanks to the revolution in deep learning, these programs can be adjusted to play Chess and Go at your level, and with a human-like playing style. wBridge5, a former Computer Bridge World Champion is included as well, as are several graphical interfaces and analysis tools.

The classic Korean war flight sim Mig Alley is also in this package. Mig Alley is to combat flight sims what Grand Prix Legends is to sim racing. At the dawn of the jet age, aircraft were flown by feel and instruments alone with no fly-by-wire control systems. Too many G's can easily rip the wings off a plane or cause a flameout. In the Soviet MiG 15, you can feel adverse yaw and tail blanking. The flight models reproduce real-world specific power curves and also bring out the differences between the various aircraft.

Many flight sims take place in a strangely empty world, but not this one. In Mig Alley you are flying in and also leading the UN air campaign in an unscripted simulation of all air and ground forces in the 1950 Korean war.



Also included is Battle of Britain. Playing either the British or the German side, you control all air assets in an unscripted campaign and also jump in to fly as desired. As with Mig Alley, which uses the same game engine, you can pick targets, manage logistics, create custom missions and assess intelligence, giving you insight into this period in history.

Flyable planes include the spitfire, hurricane, ME 109 E4, ME 110 and Stuka. Engine behavior and prop pitch are modeled, along with other aircraft systems.

Mig Alley and Battle of Britain are good preparation for the most complex and enduring combat flight/war sim of them all, Falcon 4. The Free Falcon version is included with this package.

Manage the air war and fly for Egypt, Syria, Israel, Serbia, the UN, or any of the other combatants in the Yom Kippur War, the Six Day War, Lebanon Invasion or Balkans conflict.



Day 1.10:45:00    x1 ▼

Alternate Field

Beirut

4.0
2
6

76.0

Hermon Radar Station was captured by Israeli forces.







MiG-29A (MiG-29C VVS)
160 - 0.53

1.05 nm
053R Cold

AIM-9X
150 ↑ 1.

F-16C (Viper)
150 ↓ 0.37