Student Name : Israel Finnerty

Project Repo URL : <https://github.com/IsraelFinnerty/SmartTank>

Project Website : <http://thetreehouse.ie/SmartTank.php>

Project Video : <https://drive.google.com/file/d/1g5_Z0M_d8vuQsZymsT17bshLl9rQTgzZ/view>

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| Grade Band | Combined Knowledge | Networking Technologies | IoT Solution | Communication |
| Base | 2 programme strands present in output. Basic knowledge of each exhibited. Programming & Database SQL | Physical/Data link layer solution. | Basic solution that may form basis of overall application. Sensor focused. | Read me and video – Readme on Github Repo and video link posted above. |
| Good | I have applied concepts from more than two modules/strands. Programming, Database & Web Development | Wireless protocols. >1 protocol. Interconnected devices. HTTP, TCP/IP, 802.11 | Solution with clear IoT and domain application. Includes processing/ gateway function – Smart Home Device. ThingSpeak React processing and website gateway. | Portfolio/repository includes clear presentation, documentation. GitHub Repo with all required files, proposal presentation and final presentation |
| Excellent | >2 strands as above and including more advanced knowledge and concepts. Web Development advanced concepts including forms, responsiveness, forwarding and database requests. Programming Skills advanced concept development | Lightweight messaging. Architecture that mediates between high and low level devices. Sensor -> Pi -> Router -> Thingspeak -> Website with Reacts -> ThingHTTP & ThingTweet | IoT Application of good prototypical standard. Used to evaluate overall suitability for a production system. - Prototype system developed, implemented and demonstrated. | Additional communication resources. Demonstration video and extended instructional readme for developers to install and deploy system. |
| Outstanding | All above, including self-acquired knowledge over and above module content. PHP, Electronics, Agile & Python | All previous to excellent level. Excellent Use of Cloud/IoT specific platforms. ThingSpeak, Cloud SQL DB, Cloud Website Hosting. | Novel solution of clear applicability to specific domain. Smart Tank is novel and applicable, could be commercially viable. | All the above, accessible project platform – website. User website with dashboard available showing widgets. |

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Additional Comments:

* Advanced concepts of Website Development demonstrated with a mobile responsive CSS website that uses PHP to make requests from a cloud based SQL database and sends emails using PHP from a HTML form that posts data from user input.
* Developed an SQL database that stores information about local oil providers – OilProviders(id, name, location, gps, email, phone) Primary Key id. This database was originally hosted on a provisioned local VM using vagrant and the Ruby language, following the steps in the Labs. After unsuccessful PHP connection attempts to the local VM DB server, I exported the DB and imported the DB on a Cloud based Remote Server.
* While researching the HC-SR04 ultrasonic sensor I became familiar with principles of electronics and the use of breadboards and resistors (330Ω & 470Ω).
* Demonstrated and developed my Programming Skills, expanding on my Python knowledge by undertaking some projects including designing a python based card game and an International Space Station tracking and display script. Python scripting was used to send sensor data from the Pi to ThingSpeak using the write API key.
* Utilised Agile principles of completing the minimal viable product MVP and then adding functionality. Also avoided context switching by focusing on one area of project development at one time.

