Project 4 Task 1 – NASA Tech Port Projects, by Spriha Gupta

Description: My application allows user to select a project from a list(dynamic) of 10 most recently updated projects on the NASA TechPort API. It can be assumed that the app caters to the NASA audience aware of the project ids. The application takes the selected option from the user and uses it to fetch and display the project details-name of the project, status of the project and organization leading the project. Here is how my application meets the task requirements:

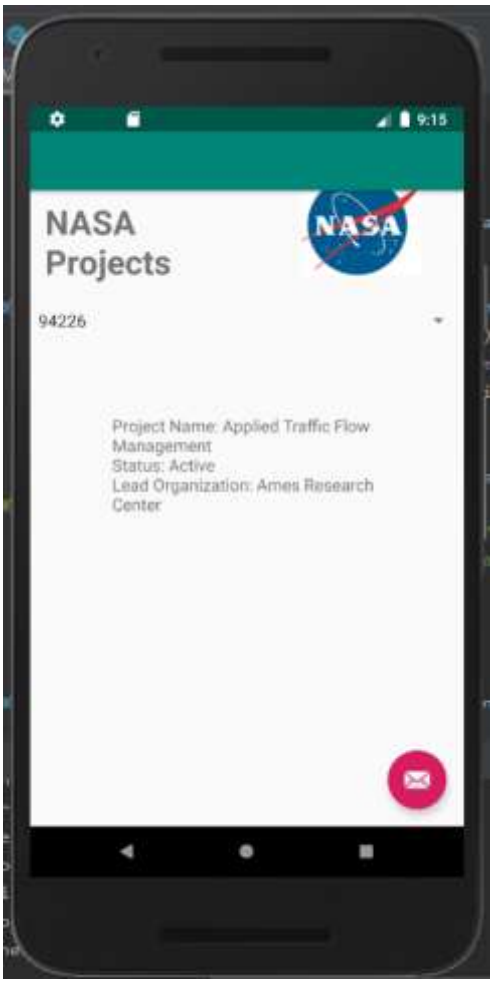
1. Implement a native Android application

The name of my native Android application project in Android Studio is: Project4Task1

1.1. Has at least three different kinds of views in your Layout (TextView, EditText, ImageView, etc.)

My application uses 2 TextViews, Spinner(drop down), and ImageView.

Here is a screenshot of the layout on start-up (before the details have been fetched).



1.2. Requires input from the user

Here is a screenshot of the user searching for the project 95031:

1.3. Makes an HTTP request (using an appropriate HTTP method) to your web service

My application does HTTP GET requests in GetDetails.java. The HTTP request on-create(at start-up) is:

https://radiant-everglades-11032.herokuapp.com/getProjIDs i.e no search parameter is provided.

On-selecting a project id, the HTTP request is:

https://radiant-everglades-11032.herokuapp.com/getProjIDs?searchWord="+urls[0]+"&dev="+dev+"&id="+urls[1]

In Task1, dev and urls[1] is ignored by the web service. In Task2, dev and urls[1] is stored in db as logs.

1.3. Receives and parses an XML or JSON formatted reply from the web service

An example of the JSON reply is:

{"project":{"benefits":" WetLab-2 allows investigators to obtain real-time gene expression data from biological samples processed and analyzed aboard the space station. Studies that characterize how spaceflight affects the gene expression of cells, microbes and tissues are key to helping researchers to better understand how life is affected by or adapts to spaceflight. Gene expression data helps reveal the molecular and cellular mechanisms involved with spaceflight-induced conditions such as bone and muscle loss, impaired immunity, and increased microbial virulence. Knowledge of these mechanisms can be applied towards developing countermeasures for protecting human health during long-term space missions and also for treating diseases on Earth. ","programDirectors":["Diana C Halarde","Craig E Kundrot"],"responsibleProgram":"Space Life and Physical Sciences Research and Applications Division","supportedMissionType":"Projected Mission (Null)","endDate":"Jan 2024","primaryTax":{"code":"TA8","id":10510,"title":"Science Instruments, Observatories, and Sensor Systems","priority":null},{"code":"TA8.3","id":8896,"title":"In-Situ Instruments and Sensors","priority":null},{"code":"TA8.3.3","id":9502,"title":"In-Situ (other)","priority":null}],"programManagers":["Devon H Griffin","Nicole A Rayl"],"description":" WetLab-2 is a research platform for conducting real-time quantitative gene expression analysis aboard the International Space Station. This facility enables spaceflight genomic studies involving a wide variety of biospecimen types in the unique microgravity environment of space. ","technologyMaturityCurrent":"6","title":"WetLab-2","leadOrganization":{"acronym":"ARC","city":"Mountain View","name":"Ames Research Center","state":"CA","type":"NASA Center"},"technologyMaturityEnd":"8","additionalTax":[{"code":"TA11","id":10518,"title":"Modeling, Simulation, Information Technology and Processing","priority":null},{"code":"TA11.2","id":8869,"title":"Modeling","priority":null},{"code":"TA11.2.4","id":9148,"title":"Science Modeling","priority":null}],"lastUpdated":"2023-11-05","supportingOrganizations":[{"acronym":"JSC","city":"Houston","name":"Johnson Space Center","state":"TX","type":"NASA Center"},{"acronym":"KSC","city":"Kennedy Space Center","name":"Kennedy Space Center","state":"FL","type":"NASA Center"},{"acronym":"MSFC","city":"Huntsville","name":"Marshall Space Flight Center","state":"AL","type":"NASA Center"}],"technologyMaturityStart":"4","responsibleMissionDirectorateOrOffice":"Human Exploration and Operations Mission Directorate","closeoutSummary":"","id":95051,"website":"https://www.nasa.gov/ames/research/space-biosciences/wetlab-2","libraryItems":[{"externalUrl":null,"publishedBy":"Gina Pigliucci and Sandy Duerk","description":" Biologists around the world routinely perform gene expression analysis to better understand living systems. Gene expression analysis examines the types and amounts of molecules produced by genes in living cells, telling us which genes are active and which are inactive at a given point in time. This reveals valuable information about the highly dynamic internal states of cells in living systems. NASA’s WetLab-2 hardware system is bringing to the International Space Station the technology to measure gene expression of biological specimens in space, and to transmit the results to researchers on Earth at the speed of light. “WetLab-2 is truly a first,” said Macarena Parra, WetLab-2 project scientist at NASA’s Ames Research Center in California’s Silicon Valley. “Investigators using WetLab-2 will be able to analyze the first run of a spaceflight–experiment and immediately apply what they learn to subsequent runs of the experiment during the same flight mission. ”It will allow us to accelerate the pace of research on the station while saving time and cost.” Currently, life science research aboard the space station must follow pre-set plans: A rocket carries the experiment into space, an astronaut follows the plan and then sends samples to Earth for analysis. If the post-flight analysis shows that something unusual or unpredicted occurred in space, the researcher will want to further study those phenomena, but this requires planning an entirely new experiment and waiting for an opportunity to fly it to the station. WetLab-2 employs a standard method of measuring gene expression called Quantitative Polymerase Chain Reaction, or qPCR, which involves extracting certain types of ribonucleic acid (RNA) molecules from biological samples and then measuring the amounts extracted. RNA molecules are found inside cells, and they play key roles in the basic functions of living cells, such as making cellular proteins. Today, qPCR analysis is performed in many biology labs around in the world. The WetLab-2 system uses a commercially available instrument to perform the qPCR analysis on the space station. Microgravity complicates even the simplest laboratory procedures, such as adding liquid to a test tube. Additionally, on the station, a complete pantry of chemicals is not available, and astronauts maintain a packed schedule. To address these constraints, the WetLab-2 team developed a new method to allow station crew members to extract RNA from multiple types of biological specimens in less than 30 minutes. “This innovative RNA extraction technology, currently in the patenting process, was a multidisciplinary effort of cell biologists, chemical engineers and mechanical engineers who designed the sample manipulation and processing chemistry,” said Julie Schoenfeld, WetLab-2 project manager at Ames. WetLab-2 will enable a broad range of life science investigations in space, such as analysis of genes that indicate infectious disease, cell stress, changes in cell cycle growth and development, and genetic abnormality. Researchers also can use the system for real-time analyses of air, surface and water samples to monitor environmental conditions and crew health on the station. “The ultimate goal of the WetLab-2 system is to help humans live and work in space,” said Schoenfeld. “This system will help researchers identify changes in gene expression. This can help us determine how to mitigate negative effects of spaceflight and add to our knowledge about how genes work.” The WetLab-2 system was developed at Ames and funded by the International Space Station Program at NASA’s Johnson Space Center in Houston. WetLab-2 launched April 8 aboard the eighth SpaceX cargo resupply mission to the space station. The goal of the first flight is to validate system performance. After successful completion of the validation study, WetLab-2 will be available to speed delivery of gene expression data to principal investigators on Earth for academic, commercial and NASA research. The space station serves as the world's leading laboratory where researchers conduct cutting-edge research and technology development that will enable human and robotic exploration of destinations beyond low-Earth orbit, including asteroids and Mars. ","files":[],"id":54681,"publishedDate":"Apr 2016","title":"Gene Analysis System Could Accelerate Pace of Research on the Space Station","type":"Story"},{"externalUrl":null,"publishedBy":null,"description":"NASA astronaut and Expedition 47 Flight Engineer Jeff Williams works with the WetLab-2 system aboard the International Space Station.","files":[{"size":1690023,"id":38260,"url":"https://techport.nasa.gov/file/38260"}],"id":54693,"publishedDate":null,"title":"Using WetLab in Space","type":"Image"},{"externalUrl":null,"publishedBy":null,"description":"The WetLab-2 Sample Prep Module allows crew members working in microgravity to isolate RNA and DNA from samples of cell cultures or tissues.","files":[{"size":7712997,"id":38267,"url":"https://techport.nasa.gov/file/38267"}],"id":54691,"publishedDate":null,"title":"WetLab Sample Preparation Module","type":"Image"},{"externalUrl":null,"publishedBy":"Macarena Parra, PhD","description":null,"files":[]"size":1414044,"id":38269,"url":"https://techport.nasa.gov/file/38269"}],"id":54694,"publishedDate":"Oct 2016","title":"WetLab-2 Overview","type":"Document"}],"destinations":["Earth","Mars","Foundational Knowledge"],"coFundingPartners":[{"acronym":null,"city":"Birmingham","name":"BioRX","state":"AL","type":"Industry"},{"acronym":null,"city":"Sunnyvale","name":"Cepheid","state":"CA","type":"Industry"},{"acronym":null,"city":null,"name":"Claremont BioSolutions, Inc.","state":null,"type":"Industry"},{"acronym":null,"city":"Greenville","name":"Techshot, Inc.","state":"IN","type":"Industry"}],"projectManagers":["Rudolph A Aspilcueta"],"principalInvestigators":["Macarena P Parra"],"closeoutDocuments":[],"startDate":"Mar 2015","status":"Active"}}

1.5. Displays new information to the user

Here is the screen shot after the details have been returned.

1.6. Is repeatable (I.e. the user can repeatedly reuse the application without restarting it.)

The user can select another project. Here is an example of searching for 94815

2. Implement a web application, deployed to Heroku

The URL of my web service deployed to Heroku is:

https://lit-eyrie-68843.herokuapp.com/

The project directory name is Project4Task1Web.

2.1. Using an HttpServlet to implement a simple (can be a single path) MVC

In my web app project:

Model: NASAModel

Controller: NASAServlet.java

View: Android App

2.2. Receives an HTTP request from the native Android application

NASAServlet.java receives the HTTP GET request with the argument "search", dev and id. Task 1 ignores dev and id parameters and passes the search string (project id) on to the model.

On start-up, the parameters are set to null.

2.3. Executes business logic appropriate to your application

NASAServlet.java makes an HTTP request to: https://api.nasa.gov/techport/api/projects?api_key=lKGcHbsc2qhsdWs0lAddU2CiStsR60dHUVOihivD

(on start-up) and to

https://api.nasa.gov/techport/api/projects/"+searchTag+".json?api_key="+"lKGcHbsc2qhsdWs0lAddU2CiStsR60dHUVOihivD" (when user selects project) and receives the response in JSON format.

2.4. Replies to the Android application with an XML or JSON formatted response

It then writes the JSON response to the output stream for the Android application.