Geospatial Applications Developer Assignment  
**Deadline: Monday 1st August 2016, 1700 BST**

Outlined below is the technical assignment for the role of Geospatial Applications Developer at the British Geological Survey. The assignment is based on a simple scenario and is designed to be flexible so as to give you the best opportunity to demonstrate your own technical and problem solving abilities. It is open-ended, not an exam-style test.

**Why are we asking you to do this assignment?**

The original job advertisement made it clear to applicants that a short technical assignment would be part of the application process. We believe that by asking you to do this we can get a better idea of your skill levels and approach to solving problems than from a CV alone. We have made the assignment quite simple, with scope for a range of different types of responses.

**How will the assignment be assessed?**

General approach, creativity, programme structure, good commenting, and design will all be taken into consideration when assessing the assignment. We appreciate that applicants come from different technical backgrounds and may have a limited amount of spare time and the assignment is designed with this in mind. Therefore you are free to interpret and implement the requirements in any way you choose, to any level of detail you choose

For example, you may choose to implement your solution in one of the following ways:

* Web browser-based application;
* Mobile Web application;

We are looking for evidence that you are able to understand the scenario and requirements and then deliver a well thought out, creative response in the form of:

* Well-structured source code, demonstrating appropriate use of language syntax, API and object oriented principles – an elegant, simple code structure that is not over-engineered;
* Logical code comments to help us understand your work;

If you are only able to complete part of the requirement don’t worry. It is more important that the parts you do deliver show a good style, structure and creativity. Likewise, if you are not able to deliver a fully running solution (for example there are missing pieces or errors) please do submit your work because we can still assess what you have done.

We also will assess your grasp of spatial data concepts and your ability to process and work with map-based data.

Your presentation and design skills will also be considered. We are looking for a developer who can create visually appealing interfaces that are intuitive to use.

**How long should I spend working on the assignment?**

As a guide, we believe it should be possible to implement a simple solution to a significant number of the requirements in around 2 to 4 hours. We are not looking for perfection, and do not expect you to spend days working on your solution, but ultimately it is up to you how long you spend on it. However, be careful not to over-engineer it.

**Where can I host my assignment?**

You will need to publish your application on a publically-accessible web host. There are many free web hosting services available which will allow you to develop a web application on. Examples include:

* GitHub Pages - <https://pages.github.com/>
* 000webhost - <https://www.000webhost.com/>

**How should I deliver my assignment submission?**

On completion of the assignment, you should send a publically accessible hyperlink/website URL to **bgspers@bgs.ac.uk**.

Please make sure the subject line of your email is in the form “Geospatial Applications Developer Assignment – *name*” (for example “***Geospatial Applications Developer Assignment – Joe Bloggs***”).

Please note that we will not accept files, source code or projects which require compilation or local hosting.

If you wish to include any extra comments or documentation to accompany your web application, please include these in your email.

We ***can*** accept:

* URL to published web applications

We ***cannot*** accept:

* Compiled versions of software (we will need to view any original source code);
* Supporting files in unusual/proprietary formats;
* Instructions to download additional resources;
* Non-compiled source code as plain text files;

**What will happen next?**

When we receive your email we will check it briefly to ensure the URL is accessible, and we will then acknowledge receipt of your email. We will aim to do this within around 2 working days.

We will assess your work and use it along with your CV to shortlist for interview. If you are invited to interview, please bear in mind that you will be expected to answer technical questions regarding your assignment.

Good luck!

The Development Team, British Geological Survey

**Assignment**

You have been asked by the Keyworth planning committee to help visualise geological data within and surrounding the village. The committee wants to publish this information so the application must be accessible from the internet via a web browser.

You have been given location data for geological observations recorded within this area. Each observation could be one of borehole, fossil specimen, rock sample or measurement. All observations contain location coordinates, Z elevation value, date, time, and name of who recorded the observation. Additional attributes specific to each type of observation are also given.

Develop a web-based application which does the following:

1. Displays the locations of geological observations provided on a map.
2. Provides tools to navigate the map by:
   1. Zooming in/out
   2. Searching for a location e.g. post code, place name
3. Allow the user to interact with the data on the map, providing at least 2 of the following pieces of information:
   1. Selected observation name e.g. borehole, fossil
   2. The geographical coordinate for the selected observation
   3. The date and time of collection
   4. An appropriate image for the observation.
4. (Optional) Visualise other relevant open source environmental datasets which may be of interest to the Keyworth Planning Committee. For examples, please visit the BGS Web Map Services page: http://bgs.ac.uk/data/services/wms.html

Tables 1 – 4 below provide you with the data required for this assignment. This data is provided as delimited text files included in the assignment folder.

***Table 1: Geological observations of type ‘Borehole’***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Type | X | Y | Z | Date | Time | Recorded by | Drilled depth (m) |
| B1 | Borehole | 460650.7 | 331169.9 | 245 | 02/01/2012 | 13:24:00 | Bob | 26.5 |
| B2 | Borehole | 461352.2 | 331510.1 | 275 | 03/01/2012 | 10:17:00 | Brian | 21.25 |
| B3 | Borehole | 462627.7 | 330643.8 | 235 | 04/01/2012 | 15:22:00 | Gary | 15.75 |
| B4 | Borehole | 462287.6 | 330537.5 | 240 | 05/01/2012 | 08:36:00 | Trevor | 29.5 |

***Table 2: Geological observations of type ‘Fossil’***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Type | Latitude (WGS84) | Longitude (WGS84) | Z | Date | Time | Recorded by | Species | Image |
| F1 | Fossil | 52.8720616627 | -1.07582054272 | 260 | 02/01/2012 | 10:07:00 | Trevor | Trilobite | TRILOBITE.jpg |
| F2 | Fossil | 52.8738050262 | -1.07262476349 | 265 | 03/01/2012 | 19:08:00 | Gary | Gastropod | GASTROPOD.jpg |
| F3 | Fossil | 52.8784708377 | -1.08902938435 | 255 | 04/01/2012 | 17:28:00 | Brian | Bryozoans | BRYOZOANS.jpg |
| F4 | Fossil | 52.8777505587 | -1.08865071184 | 230 | 05/01/2012 | 16:04:00 | Bob | Brachiopod | BRACHIOPOD.jpg |

***Table 3: Geological observations of type ‘Rock’***

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Type | X | Y | Z | Date | Time | Recorded by | Rock name | Image |
| R1 | Rock | 460687.9 | 332158.5 | 280 | 02/01/2012 | 08:30:00 | Gary | Limestone | LIMESTONE1.jpg |
| R2 | Rock | 460964.3 | 331467.6 | 285 | 03/01/2012 | 12:05:00 | Bob | Limestone | LIMESTONE2.jpg |
| R3 | Rock | 462866.9 | 328927.2 | 235 | 04/01/2012 | 13:02:00 | Trevor | Sandstone | SANDSTONE1.jpg |
| R4 | Rock | 461878.4 | 329352.3 | 265 | 05/01/2012 | 15:21:00 | Brian | Sandstone | SANDSTONE2.jpg |

***Table 4: Geological observations of type ‘Measurement’***

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Type | Latitude (WGS84) | Longitude (WGS84) | Z | Date | Time | Recorded by | Porosity |
| M1 | Measurement | 52.8789713501 | -1.07354136202 | 270 | 02/01/2012 | 16:05:00 | Brian | 0.12 |
| M2 | Measurement | 52.8762933868 | -1.07320318216 | 260 | 03/01/2012 | 09:17:00 | Trevor | 0.05 |
| M3 | Measurement | 52.8760911221 | -1.07170679348 | 240 | 04/01/2012 | 11:07:00 | Bob | 0.15 |
| M4 | Measurement | 52.8861453343 | -1.07449419249 | 245 | 05/01/2012 | 14:48:00 | Gary | 0.23 |