**BCS Digital Industries Apprenticeship**

**Template 4 – Employer Reference**

**Level 4 Software Developer Apprenticeship**

**Version 4.0**

**May 2019**

**Change History**

Any changes made to the project shall be clearly documented with a change history log. This shall include the latest version number, date of the amendment and changes made. The purpose is to identify quickly what changes have been made.

|  |  |
| --- | --- |
| Version Number and Date | Changes Made |
| V4.0  May 2019 | Change History table added to document. Major changes to document throughout. Standard specific competencies and proficiencies unchanged. |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

## Software Developer Template 4 – Employer Reference

**Apprentice Details**

|  |  |
| --- | --- |
| Name | Samuel Culley |
| ULN number | 3228736732 |

**Training Provider Details**

|  |  |
| --- | --- |
| Contact name | Carina Jones |
| Company name | Makers Academy |
| Company address |  |

**Employer Details**

|  |  |
| --- | --- |
| Name | Government Digital Service |
| Company address | The Whitechapel building  10 Whitechapel High St, London E1 8QS |
| Signed by: Daniele Occhipinti  Print name: Daniele Occhipinti  Job title: Technical Architect  Date: 16 October 2019 | |

**Section 1**

**Starting the Apprenticeship**

The apprentice may have just joined your organisation but could also be an existing employee who has joined the apprenticeship programme.

The intent of the employer reference is for you to support your apprentice by validating the evidence that they have submitted for end point assessment (EPA).

**You should complete this initial section when the apprenticeship starts.**

## Software Developer Standard Number ST0116

The knowledge, skills and behaviours that must be demonstrated by the end of this apprenticeship are defined by the Standard:

<https://www.instituteforapprenticeships.org/apprenticeship-standards/software-developer/>

**Role Profile**

The primary role of a software developer is to build and test simple, high-quality code across front end, logic and database layers. A developer will typically be working as part of a larger team, in which they will have responsibility for some of the straightforward elements of the overall project. The developer will need to be able to interpret design documentation and specifications. The customer requirements will typically be defined and agreed by more experienced or specialist members of the team, such as a business analyst or technical architect.

**Typical Job Roles**

Web Developer, Application Developer, Mobile App Developer, Games Developer, Software Developer.

**Please complete the following fields:**

|  |  |  |
| --- | --- | --- |
| **Job Title of Apprentice** | **Brief Summary of the Common Duties that the Apprentice Will be Doing for your Organisation** | **Date Started** |
| Apprentice Developer | Develop and test high-quality software as part of a team. Write documentation, debug issues and contribute to the direction of the project. | 01 / 10 / 2018 |

The standard defines the technical knowledge and understanding that will be required by the apprentice, these will generally be delivered by the training provider that you have chosen to work with. This knowledge and understanding will be confirmed by the two knowledge modules, each of these must be successfully covered, either by passing an approved knowledge module exam or via a vendor certification proxy. In the case of this standard one approved vendor certifications must be passed. This certification will provide a proxy for a specific knowledge module.

Over their time on the apprenticeship, your apprentice will apply the underpinning knowledge gained through the training to actual work-related activities required by the role that you have employed them to fulfil. The apprentice should work with one or more mentors within your organisation who will provide advice, guidance and training on how the knowledge gained by the apprentice is applied in actual working situations.

The standard also defines a number of technical competences, your apprentice must demonstrate competence in all of them to achieve the standard. The following must bedemonstrated by the apprentice in their Summative Portfolio, which provides evidence against the totality of the standard, based on the application of knowledge, competence and behaviours to real work projects in the work environment.

## Technical Competencies

* **Logic:** writes good quality code (logic) with sound syntax in at least one language.
* **User interface:** can develop effective user interfaces for at least one channel.
* **Data:** can effectively link code to the database/data sets.
* **Test:** can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.
* **Problem solving:** can apply structured techniques to problem solving, can debug code and can understand the structure of programmes in order to identify and resolve issues.
* **Design:** can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.
* **Analysis:** can understand and create basic analysis artefacts, such as user cases and/or user stories.
* **Deployment:** can understand and utilise skills to build, manage and deploy code into enterprise environments.
* **Development lifecycle:** can operate at all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on build and test.
* Can **apply good practice** approaches according to the relevant paradigm (for example object oriented, event driven or procedural).
* Can **interpret and follow:**
  + software designs and functional/technical specifications;
  + company defined ‘coding standards’ or industry good practice for coding;
  + testing frameworks and methodologies;
  + company, team or client approaches to continuous integration, version and source control.
* Can **respond to the business environment** and business issues related to software development.
* Can operate effectively in their own business’s, their customers’ and the **industry’s environments**.
* Can **apply the maths** required to be a software developer (e.g. algorithms, logic and data structures).

BCS have created a Standard Specific Guide for this standard and also provides Template 5 – Summative Portfolio Checklistwhich gives advice and guidance on what types of evidence are suitable for each of the above criteria, it also includes specific details of the minimum evidence requirements.

Please note, the apprenticeship standards are designed to cover a wide range of different job roles so there may be a small number of areas within these mandatory requirements that are not naturally occurring within the day-to-day duties of your apprentice. If you are a larger organisation, it is perfectly acceptable for you to second your apprentice to a different department for a period (at least a week) to allow them exposure to some activities that they may not come into contact with. If this is not possible, you, your apprentice and your selected training provider should select a synoptic project that will allow your apprentice to demonstrate that they are competent in criteria that they are not exposed to during their normal working activities. Please also note, the synoptic project is the only area within the submitted portfolio of evidence that does not draw from the real work environment

**Section 2**

**Technical Competence Evaluation**

.

Please provide your evaluation of the technical competence of the apprentice using the tables below. Under each heading are details of the activities that a competent apprentice should be able to demonstrate by the time that they are judged ready, by you, your chosen training provider and the apprentice themselves, to apply for the EPA.

We strongly recommend that you continually review your apprentice against these competences throughout the duration of the apprenticeship and periodically update this document. A suitable time to add comments and evidence could be during your performance reviews (or similar) with your apprentice.

**Competence – Logic**

**Logic: writes good quality code (logic) with sound syntax in at least one language.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam has used mainly Ruby (on Rails) but he did work with other of the languages needed to cover the full-stack.  The most complex work on Ruby was on writing redirects that go to various pages based on different parameters. This was written in a Rails app using Ruby, and involved making sure that redirects didn’t overlap incorrectly, and all possible incoming fields were handled appropriately.  In the spelling suggestions, Sam worked impressively on the whole stack: from data to user interaction, using HTML, CSS and Javascript.  All of the code Sam submitted was peer reviewed, and the feedback I received from other developers about his code has been positive.  **------------------**  NOTE: this box will expand as required |

**Competence – User Interface**

**User interface: can develop effective user interfaces for at least one channel.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam has worked on the frontend for a spelling suggestion feature. This displays suggestions for misspelled words to users, which involved writing HTML/CSS and Javascript code. Additionally, he has adjusted page layout based on this new feature, using organisation components.  He has also worked on creating highlighting on a web page for search terms. This involved adding HTML markup to search results, which were being retrieved from a database. Additionally, there are some security features that our site uses that filter out any unwanted HTML, so Sam has also added additional logic to this security to enable the highlighting markup to pass through.  NOTE: this box will expand as required |

**Competence – Data**

**Data: can effectively link code to the database/data sets.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam’s work on the spelling suggestions feature has involved manipulating JSON representations of data coming from a database. Sam has also worked with ElasticSearch when adding highlights to search results.  Most of the work Sam has done has been on our search tools, which involve making API requests to our databases. Additionally, Sam has worked with our email subscription service, where he has created tasks that look through the database and remove any defunct subscriptions.  NOTE: this box will expand as required |

**Competence – Test**

**Test: can test code and analyse results to correct errors found using either V-model manual testing and/or using unit testing.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam’s work on redirects has involved him writing tests for the new functionality that he has introduced. He’s also shown an efficient approach to testing by running subsets of tests frequently between code changes, and only running the entire suite for key checkpoints.  When working on the feed subscription redirect work, Sam added simple tests that would only look at his new feature, but also was conscious of the benefit of hunting down tests that were no longer relevant so as to keep the test suite in good order.  While developing in Javascript, Sam was leverage the console.log() browser command to have a quick feedback when trying to debug issues.  NOTE: this box will expand as required |

**Competence – Problem Solving**

**Problem solving: can apply structured techniques to problem solving, can debug code and can understand the structure of programmes in order to identify and resolve issues.** (Note – this has a requirement for using a minimum of two problem solving tools)

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  First: When Sam had to develop the email subscription feature, he first explored the platform to find an existing pattern for consistency. That was the right thing to do, and that led him to discover there was no consistency. With that discovery he came back to the product manager and the rest of the team with different options to move things forward and how they stacked up against each other.  Second: Adding highlights to search terms - Sam was facing the issue that the mark-up was stripped out from ElasticSearch to the output on the webpage. There were many layers that could have been responsible. Sam tackled this difficult debugging and resorted to have to change how the application is initialised and launched, really diving into the internals of how the microservices function.  NOTE: this box will expand as required |

**Competence – Design**

**Design: can create simple data models and software designs to effectively communicate understanding of the program, following best practices and standards.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)** Sam has worked with the designer on the team to create page layout specifications. These consist of annotated page displays, with information about current and ideal states, as well as what changes would need to be made to achieve them. He’s also attended several sessions that have set out the structure of the project using software diagrams, showing how separate components connect together (e.g. introduction to the GOV.UK architecture). NOTE: this box will expand as required |

**Competence – Analysis**

**Analysis: can understand and create basic analysis artefacts, such as user cases and/or user stories.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  When Sam realised there was an inconsistency in how GOV.UK was presenting the email signup feature, he analysed the different options and eventually created a technical debt card, that he made sure could have been understood at a later date by whoever would have tackled the debt - that took a lot of analytical work to make sure the context was clear. Sam wrote a description of the different email signup formats that we had across search tools, and what issues were occurring with each of them. He then provided several different options for fixing this, and what would be required for each of them.  NOTE: this box will expand as required |

**Competence – Deployment**

**Deployment: can understand and utilise skills to build, manage and deploy code into enterprise environments.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam understands the deployment pipeline very well and he is very familiar with the different types of automatic checks that are performed at each stage. Sam’s works has been deployed to production by the automatic deployment system on several occasions.  When Sam was adding redirects for the feed subscription service, he received feedback which asked about changing how certain tests were run from a team member when he made an initial pull request. Sam went through the feedback, making changes to his code where necessary, and responded to the team member explaining what changes had been made. Once this part of the review process was finished, he merged his branch into the master branch, and continued with the deployment process.  NOTE: this box will expand as required |

**Competence – Development Lifecycle**

**Development lifecycle: can operate at all stages of the software development lifecycle, with increasing breadth and depth over time with initial focus on build and test.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Consistently during his projects (e.g. redirects), Sam was able to switch back and forth between developing and testing his code, putting in practise a quick feedback loop mechanism that allowed him to improve his code in an agile way. This follows the test driven approach to developing code, which Sam has used when working on different projects.  Sam has also worked on the 2nd-line support team, which involved him responding to user requests, investigating bugs, and following incident management processes. He has also had to liaise with users to gather their feedback on changes that were made to the product.  NOTE: this box will expand as required |

**Competence – Applying Good Practices**

**Can apply good practice approaches according to the relevant paradigm (for example object oriented, event driven or procedural).**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam has become very familiar with the MVC (model/view/controller) offered by the application framework his team have been using. For example, in the feed subscription redirect, Sam understood the core logic was in the controller layer.  When Sam created a new Rake task, he rightly organised the new code in a class rather than having behaviours scattered around the codebase. In the same task, he applied filters to a list in a way that was close to functional programming, which shows Sam can use different programming paradigms depending on the task.  In the spelling suggestion project, in the concept of frontend code, Sam used the concept of Block Element Modifier to encapsulate the new part of user interface he was adding  NOTE: this box will expand as required |

**Competence – Interpret and Follow**

**Can interpret and follow:**

* **software designs and functional/technical specifications;**
* **company defined ‘coding standards’ or industry good practice for coding;**
* **testing frameworks and methodologies;**
* **company, team or client approaches to continuous integration, version and source control.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam has reached a good proficiency because of his deep understanding of the release cycle - he was checking code in regularly to source control, asked people to review his PRs and used our CI tools for finding out about issues his code may have had.  I was impressed by how meticulous Sam has been about making sure his code was passing coding standards and linting.  I really like the thoroughness Sam puts in his PR descriptions: they are very useful, including relevant links and mentioning the other developers he has paired with on the work. Sam writes good commit messages, in line with team conventions.  I’ve also noticed Sam makes an effort to name things in a way that is self explanatory and simple to understand, for example the extra parameter he added to the redirect\_to\_news\_and\_communication function is called “format” - very simple and clear. I’ve learned that Sam does that because he was able to appreciate how good names helped him do his job - this shows his ability to reflect on his work.  During spelling suggestions, Sam used the CSS spacing function of GOV.UK rather than hardcoding units.  NOTE: this box will expand as required |

**Competence – Respond to Business Environment**

**Can respond to the business environment and business issues related to software development.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  Sam has spent time on the second line support team, which has involved him responding to user issues and monitoring various metrics across the application. Doing this has required him to speak to various teams across the organisation, especially the reliability engineering team.  With the Feed subscription redirect, Sam correctly identified the bigger picture, that is was to enable the transition from older search tools to newer one. That business need was to have a more maintainable system together with a better user experience.  Sam has also participated in meetings with 3rd parties, which has involved him speaking about technical limitations and requirements with non-technical staff. He has helped the product manager talk with other technical teams, providing write-ups for issues that can be sent back to stakeholders.  In particular he has attended a meeting with the Maritime and Coastguard Agency, where he explained the technical features of one of our specialist search tools.  NOTE: this box will expand as required |

**Competence – Industry Environment**

**Can operate effectively in their own business’s, their customers’ and the industry’s environments.**

|  |
| --- |
| How has your apprentice demonstrated competence in this area? (please give examples)  Sam has worked on a wide variety of issues, and has been part of a regular sprint process. This involves contributing to daily standups, discussing ongoing work and progress. Several times he’s requested additional information and help with things that he’s been working on, and has gone to different areas of the organisation to find out the answers to the questions he’s had. In particular, Sam was asked to obtain information about the formatting for titles of Content on the site - Sam spoke to someone in the content team, and obtained a guidance document that was then able to be sent back to the 3rd party.  Sam has maintained an awareness of his stress levels, and has taken action to mitigate potential issues - this has included him attending regular meditation sessions at work, and participating in training related to understanding workplace environments.  He has also learned about our organisational values as well as our approaches to designing for users. This includes using a toolkit for frontend components which follow our branding, and helping with user research as part of our ethos which puts users first.  NOTE: this box will expand as required |

**Competence – Application of Mathematics**

**Can apply the maths required to be a software developer (e.g. algorithms, logic and data structures).**

|  |
| --- |
| How has your apprentice demonstrated competence in this area? (please give examples)  During the redirect project Samuel identified the data structure that was holding the redirection configuration and extended it based on the new requirements.  When he was creating a new Rake task, he decided to organise the subscribers in a list and apply filters to it, using something in the line of functional programming.  As part of Sam’s work on the second line support team, he has had to interpret metrics that we use to monitor the status of our applications. This involves looking at graphs to identify patterns, and working out where values are outside of expected ranges.  NOTE: this box will expand as required |

**Section 3**

**Behaviours, Business Skills and Level of Responsibility Evaluation**

Please provide an evaluation as to the level of responsibility of the apprentice you are providing a reference for using the tables below. Under each heading is a list of proficiencies that a competent apprentice should display.

**Proficiency – Business Skills**

* **Demonstrates an analytical and systematic approach to issue resolution.**
* **Takes the initiative in identifying and negotiating appropriate personal development opportunities.**
* **Demonstrates effective communication skills.**
* **Contributes fully to the work of teams.**
* **Plans, schedules and monitors own work (and that of others where applicable) competently within limited deadlines and according to relevant legislation, standards and procedures.**
* **Appreciates the wider business context, and how their role relates to other roles and to the business of the employer of client.**

|  |
| --- |
| How has your apprentice demonstrated competence in these areas? (please give examples)  Demonstrates an analytical and systematic approach to issue resolution:  While developing the email subscription feature Sam came across a bug in another part of the code. Rather than be derailed by that, he consulted with his tech lead and it was decided to create a card for fixing the bug at a later date, so that Sam could focus back on his main goal.  Takes the initiative in identifying and negotiating appropriate personal development opportunities:  Sam has identified gaps in the areas that he has been working on, in particular for user interface work, and has put extra effort into finding frontend developers who he would be able to pair on tickets with.  Sam has also participated in learning opportunities involving SQL and PostGres which have taken place across several weeks.  Demonstrates effective communication skills:  When Sam had to fix email signups, he kept in touch with the user who requested the change and eventually, after his investigative work, he let the user know the change could not be implemented in the short-term. This involved Sam managing the expectations of the end user, explaining the time frames for the potential fix.  Sam uses Slack very efficiently to keep the rest of the team up-to-date with his work and to elicit feedback on PRs and other things.  When Sam was ready to pair up on new stories he would communicate it during stand-up which is the most effective way as the whole team is present.  Contributes fully to the work of teams:  During the spelling suggestions, Sam gave very insightful comments on the hyphotesis to be taken into account and the metrics to be used for measuring success. His previous role as Business Analyst must have given him solid foundations for that.  Plans, schedules and monitors own work (and that of others where applicable) competently within limited deadlines and according to relevant legislation, standards and procedures:  Moving cards across the board as the story was changing his status (e.g. reviewing, completed).  Sam was making sure the state of his work was visible - for example was moving the cards he would have been working across the board depending if the work was in progress, if it was been tested or released to production.  Appreciates the wider business context, and how their role relates to other roles and to the business of the employer of client:  Redirect work - he liaised with a different team (Performance Analysts) to assess whether his work was impacting the way we monitor the platform.  He has also provided explanations to third parties when work would need to be put into a backlog, and why issues wouldn’t be able to be resolved immediately. He has had to explain why work has been de-prioritised.  NOTE: this box will expand as required |

**Proficiency – Complexity**

* **Performs a range of work, sometimes complex and non-routine, in a variety of environments.**
* **Applies methodical approaches to issue definition and resolution.**
* **Undertakes all work in accordance with agreed safety, technical and quality standards, using appropriate methods and tools.**

|  |
| --- |
| How has your apprentice demonstrated competence in this area? (please give examples)  Performs a range of work, sometimes complex and non-routine, in a variety of environments:  The work on the Rake tasks was complex, involving diving deep into the code bask, understand the Rake framework and extending the code appropriately.  For the spelling suggestions, Sam had to write quite complex Javascript code to implement the user interaction with the page and content, even resorting in asynchronous code.  Applies methodical approaches to issue definition and resolution:  When trying to solve a problem, Sam was first understanding what code or pattern he could reuse, rather than adding another way to solve the same problem. For instance, during the creation of a new Rake task, Sam started by looking at an existing task to have a good starting reference.  Undertakes all work in accordance with agreed safety, technical and quality standards, using appropriate methods and tools:  Sam has used a variety of software that has enabled him to work on our applications - in particular he has had to go through processes that have allowed him to access our Amazon Web Services hosted data, and our deployment pipeline monitoring. He has set up 2-factor authentication for these, and submitted appropriate requests for approval.  He has also learned how to use our virtual machine development environments, and our Docker container version of applications.  NOTE: this box will expand as required |

**Proficiency – Autonomy**

* **Works under general direction.**
* **Uses discretion in identifying and responding to complex issues and assignments.**
* **Usually receives specific instructions and has work reviewed at frequent milestones.**
* **Determines when issues should be escalated to a higher level.**

|  |
| --- |
| **How has your apprentice demonstrated competence in this area? (please give examples)**  **Works under general direction:**  Sam takes time to understand the requirement and he shows to be very resourceful in that it draws from knowledge he has already built and existing code - for that Sam spends time to understand code to the level he needs in order to be effective.  **Uses discretion in identifying and responding to complex issues and assignments:**  Sam has spoken to various members of the team when working through tickets - in particular when he encountered uncertainty around the tests for a rake task, he spoke to a senior developer who he knew had good domain knowledge for this area. He then liaised with that developer to complete the relevant work.  **Usually receives specific instructions and has work reviewed at frequent milestones:**  Sam has created code branches to work independently (or in a pair) but still used PRs to elicit feedback from the rest of the team. He has worked from requirements set out in user stories, and made sure that his work meets the acceptance criteria for those.  **Determines when issues should be escalated to a higher level:**  During redirect, he identified the order of the redirects needed to be clarified, and therefore escalated that to  the PM in the team. This resulted in him getting clarification on requirements, which enabled him to complete the ticket.  NOTE: this box will expand as required |

**Proficiency – Influence**

* **Interacts with and influences colleagues.**
* **Has working level contact with customers, suppliers and partners.**
* **May supervise others or make decisions which impact the work assigned to individuals or phases of projects.**
* **Makes decisions which influence the success of projects and team objectives.**

|  |
| --- |
| How has your apprentice demonstrated competence in this area? (please give examples)  Interacts with and influences colleagues:  Communicating using various channels at work, such as Slack and Hangouts - using these to make requests for things like reviewing work, organising pairing sessions, contributing to meetings remotely, and providing feedback on designs.  Has working level contact with customers, suppliers and partners:  Sam has attended meetings with 3rd parties, in particular speaking with the Maritime Coastguards Agency, acting as the technical member of the team for a meeting. He’s also responded to 2nd line tickets, and given technical write ups for bugs that have come through to our backlog.  May supervise others or make decisions which impact the work assigned to individuals or phases of projects:  Sam has written a tech-debt ticket, which involved him identifying an issue that needed resolving, creating a card that includes the details of the work, and ensuring it was reviewed at a senior tech-team meeting later. This work will at some point be picked up as part of progression through that backlog.  Makes decisions which influence the success of projects and team objectives:  Sam has participated in setting Objective Key Results for the team, looking at the roadmap for the team and working out what short and long term objectives should be worked towards. He has also attended weekly planning sessions, which involve him identifying work that he will be able to do during each weekly sprint, and understanding what wider work is happening with the rest of the team.  NOTE: this box will expand as required |

**Overall Impressions and Constructive Feedback**

This section is an opportunity for you to provide written feedback outside the rigid competency structure.

It is a free text field to allow you to share general thoughts on the apprentice’s performance in case you were unable to say everything you wanted to say using the structured template.

For example, you may want to highlight some of the areas where you have not been able to give the apprentice the exposure they would have liked.

We would welcome any general constructive development advice you may wish to give.

|  |
| --- |
| Considering the complexity of the GOV.UK platform, Sam has managed to navigate the environment well.  I was very impressed by how he updates tickets with comments so that the rest of the team know about the progress of whether there is any blocker.  It is very good to see how Sam has learned to leverage the many tools that are part of a software developer arsenal. In particular I feel Sam is already very proficient with git and Github (e.g. do a force push on a branch after changes to address PR comments), which are arguably the most important tools.  Sam has also learnt to recognise when it is time to ask for help, which is not an easy skill to gain. I think that was acquired through self-reflection and by asking feedback to his colleagues, which is commendable.  He has learnt loads and I have received very good feedback from his peers. Sam is clearly very passionate about building great quality software that meets user needs, which totally reflect the ethos of GDS.  NOTE: this box will expand as required |

## Please accept our sincere thanks for the support that you have provided to your apprentice.