1. SmartCare System Requirements

2. Requirements from Specification

The requirements below are separated into functional and non-functional requirements. Each shall be given a unique identifier. Functional requirements in the form FR.XXX.Y where FR indicates a functional requirement, XXX is replaced with a number and Y is replaced by a letter from the MoSCoW acronym. Non-functional requirements shall take the same form, using NFR to signify a nonfunctional requirement. The easy approach to requirements syntax (EARS) (Mavin et al., 2009) shall be followed for requirement descriptions to ensure they are clear and concise.

2.1. User Roles and Access Control

2.1.1. Functional Requirements

Requirement ID	Description	MoSCoW
FR.001.M	The data storage system shall track if a user is a Doctor	M
FR.005.M	If a user is a Doctor, then the data storage system shall track if they work full time or part time.	M
FR.010.M	The data storage system shall track if a user is a Nurse	M
FR.015.M	The data storage system shall track if a user is a Patient	M
FR.020.M	The data storage system shall track if a user is an Admin	M
FR.025.M	When a user is successfully authenticated the system shall re-direct them to their designated dhasboard.	M
FR.030.M	If a user has not been authenticated, then the system shall prevent them from accessing the application.	M
FR.035.M	If a user has not been authenticated and they attempt to access the site, then the system shall re-direct them to the login/registration page.	M
FR.040.M	The system shall allow new users to register their details to create an account.	M
FR.045.M	When creating a new user account address information shall be retrieved using an external web service.	M
FR.050.M	The system shall allow users to request their account be deleted.	M
FR.055.M	The system shall allow the user to logout.	M
FR.060.M	When a user has been inactive for 5 minutes the system shall log them out.	M
FR.065.M	When a user attempts to access a dashboard their right to access it shall be authenticated.	M

Requirement ID	Description	MoSCoW
FR.070.M	If the user is an admin, then the system shall allow them to register new doctor users	M
FR.075.M	If the user is an admin, then the system shall allow them to register new nurse users	M
FR.080.M	If the user is an admin, then the system shall allow them to perform create operations on stored records.	M
FR.085.M	If the user is an admin, then the system shall allow them to perform read operations on stored records.	M
FR.090.M	If the user is an admin, then the system shall allow them to perform update operations on stored records.	M
FR.095.M	If the user is an admin, then the system shall allow them to perform delete operations on stored records.	M

2.1.2. Non-functional Requirements

Requirement ID	Description	MoSCoW
NFR.001.S	The user authentication and login process shall take less than 3 seconds to complete	S
NFR.005.S	The user authentication and login process shall use secure protocols	S
NFR.010.S	User passwords shall be stored as a password hash.	S
NFR.015.S	Role based access control checks shall take less than 2 seconds to complete	S

2.2. Scheduling, Work Scheme and Prescriptions

2.2.1. Functional Requirements

Requirement ID	Description	MoSCoW
FR.100.M	The system shall return a timetable of appointments for doctor users.	M
FR.110.M	The system shall return a timetable of appointments for nurse users.	M
FR.115.M	The system shall allow doctor and nurse users to mark an appointment as complete.	M
FR.120.M	The system shall allow doctor and nurse users to issue a prescription after an appointment is marked as complete.	M
FR.125.M	The system shall allow doctor and nurse users to forward a patient to a hospital after an appointment is marked as complete.	M
FR.130.M	The system shall provide an appointment booking form for patient users.	M
FR.135.M	The system shall integrate appointments with an external calendar service.	M
FR.140.M	The system shall allow patient users to request prescrition re-issuance.	M
FR.145.M	The system shall create a weekly work scheme that ensures there is 1 doctor and 1 nurse on Monday and Friday.	M
FR.150.M	The system shall create a weekly work scheme that ensures there are 2 doctors on Tuesday, Wednesday, Thursday, Saturday and Sunday.	M
FR.155.M	The system shall return a timetable of appointments for nurse users.	M

2.2.2. Non-functional Requirements

Requirement ID	Description	MoSCoW
NFR.020.S	The system shall allow nurses and doctors view patient timetables 24 hours a day, 7 days a week.	S
NFR.025.S	The system shall allow patients to view their booked appointments 24 hours a day, 7 days a week.	S
NFR.030.S	The system shall allow patients to book appointments 24 hours a day, 7 days a week.	S
NFR.035.S	The system shall allow patients to request prescription re-issuance 24 hours a day, 7 days a week.	S

2.3. Billing and Invoicing

2.3.1. Functional Requirements

Requirement ID	Description	MoSCoW
FR.160.M	The system shall calculate appointment cost based on the duration of the appointment.	M
FR.165.M	The system shall calculate appointment cost based on whether a doctor or nurse attended.	M
FR.170.M	The system shall automatically produce an invoice after each appointment is marked as completed.	M
FR.175.M	The system shall allow invoices to be exported in a pdf format.	M
FR.180.M	The system shall allow invoices to be sent directly to the NHS.	M
FR.185.M	The system shall allow invoices to be sent directly to private healthcare providers.	M
FR.190.M	The system shall allow admin users to produce a report containing patient turnover, private payments and payments sent to the NHS.	M

2.3.2. Non-functional Requirements

Requirement ID	Description	MoSCoW
NFR.040.S	Invoices shall be transferred to external services using secure protocols.	S

2.4. System Collaboration

2.4.0.1. Functional Requirements

Requirement ID	Description	MoSCoW
FR.195.M	The system shall allow nurse operations to be forward to other GP practices.	M
FR.200.M	The system shall facilitate collaboration with other GP practices via APIs.	M

2.4.0.2. Non-functional Requirements

Requirement ID	Description	MoSCoW
NFR.050.S	Invoices shall facilitate secure communication with to other GP practices using secure protocols.	S
NFR.055.S	Invoices shall facilitate secure communication with to other GP practices 24 hours a day, 7 days a week.	S

2.5. Pages

2.5.1. Functional Requirements

Requirement ID	Description	MoSCoW
FR.205.M	The system shall have a main home page.	M

Requirement ID	Description	MoSCoW
FR.210.M	The system shall have a login page.	M
FR.215.M	The system shall have a user registration page.	M
FR.220.M	The system shall have a doctor dashboard page.	M
FR.225.M	The system shall have a nurse dashboard page.	M
FR.230.M	The system shall have a patient dashboard page.	M
FR.235.M	The system shall have an admin dashboard page.	M

2.5.2. Non-functional Requirements

Requirement ID	Description	MoSCoW
NFR.060.S	The system shall provide a user interface that allows the user to reach any page within 5 clicks.	S
NFR.065.S	The system shall allow a user to access their dashboard from any page on the site in one click.	S

2.6. Full Requirements List

Functional Requirements

Requirement ID	Description	MoSCoW
FR.001.M	The data storage system shall track if a user is a Doctor	M
FR.005.M	If a user is a Doctor, then the data storage system shall track if they work full time or part time.	M
FR.010.M	The data storage system shall track if a user is a Nurse	M
FR.015.M	The data storage system shall track if a user is a Patient	M
FR.020.M	The data storage system shall track if a user is an Admin	M

Requirement ID	Description	MoSCoW
FR.025.M	When a user is successfully authenticated the system shall re-direct them to their designated dhasboard.	M
FR.030.M	If a user has not been authenticated, then the system shall prevent them from accessing the application.	M
FR.035.M	If a user has not been authenticated and they attempt to access the site, then the system shall re-direct them to the login/registration page.	M
FR.040.M	The system shall allow new users to register their details to create an account.	M
FR.045.M	When creating a new user account address information shall be retrieved using an external web service.	M
FR.050.M	The system shall allow users to request their account be deleted.	M
FR.055.M	The system shall allow the user to logout.	M
FR.060.M	When a user has been inactive for 5 minutes the system shall log them out.	M
FR.065.M	When a user attempts to access a dashboard their right to access it shall be authenticated.	M
FR.070.M	If the user is an admin, then the system shall allow them to register new doctor users	M
FR.075.M	If the user is an admin, then the system shall allow them to register new nurse users	M
FR.080.M	If the user is an admin, then the system shall allow them to perform create operations on stored records.	M
FR.085.M	If the user is an admin, then the system shall allow them to perform read operations on stored records.	M
FR.090.M	If the user is an admin, then the system shall allow them to perform update operations on stored records.	M

Requirement ID	Description	MoSCoW
FR.095.M	If the user is an admin, then the system shall allow them to perform delete operations on stored records.	M
FR.100.M	The system shall return a timetable of appointments for doctor users.	M
FR.110.M	The system shall return a timetable of appointments for nurse users.	M
FR.115.M	The system shall allow doctor and nurse users to mark an appointment as complete.	M
FR.120.M	The system shall allow doctor and nurse users to issue a prescription after an appointment is marked as complete.	M
FR.125.M	The system shall allow doctor and nurse users to forward a patient to a hospital after an appointment is marked as complete.	M
FR.130.M	The system shall provide an appointment booking form for patient users.	M
FR.135.M	The system shall integrate appointments with an external calendar service.	M
FR.140.M	The system shall allow patient users to request prescrition re-issuance.	M
FR.145.M	The system shall create a weekly work scheme that ensures there is 1 doctor and 1 nurse on Monday and Friday.	M
FR.150.M	The system shall create a weekly work scheme that ensures there are 2 doctors on Tuesday, Wednesday, Thursday, Saturday and Sunday.	M
FR.155.M	The system shall return a timetable of appointments for nurse users.	M
FR.160.M	The system shall calculate appointment cost based on the duration of the appointment.	M
FR.165.M	The system shall calculate appointment cost based on whether a doctor or nurse attended.	M

Requirement ID	Description	MoSCoW
FR.170.M	The system shall automatically produce an invoice after each appointment is marked as completed.	M
FR.175.M	The system shall allow invoices to be exported in a pdf format.	M
FR.180.M	The system shall allow invoices to be sent directly to the NHS.	M
FR.185.M	The system shall allow invoices to be sent directly to private healthcare providers.	M
FR.190.M	The system shall allow admin users to produce a report containing patient turnover, private payments and payments sent to the NHS.	M
FR.195.M	The system shall allow nurse operations to be forward to other GP practices.	M
FR.200.M	The system shall facilitate collaboration with other GP practices via APIs.	M
FR.205.M	The system shall have a main home page.	M
FR.210.M	The system shall have a login page.	M
FR.215.M	The system shall have a user registration page.	M
FR.220.M	The system shall have a doctor dashboard page.	M
FR.225.M	The system shall have a nurse dashboard page.	M
FR.230.M	The system shall have a patient dashboard page.	M
FR.235.M	The system shall have an admin dashboard page.	M

2.5.2. Non-functional Requirements

Requirement ID	Description	MoSCoW
NFR.001.S	The user authentication and login process shall take less than 3 seconds to complete	S

Requirement ID	Description	MoSCoW
NFR.005.S	The user authentication and login process shall use secure protocols	S
NFR.010.S	User passwords shall be stored as a password hash.	S
NFR.015.S	Role based access control checks shall take less than 2 seconds to complete	S
NFR.020.S	The system shall allow nurses and doctors view patient timetables 24 hours a day, 7 days a week.	S
NFR.025.S	The system shall allow patients to view their booked appointments 24 hours a day, 7 days a week.	S
NFR.030.S	The system shall allow patients to book appointments 24 hours a day, 7 days a week.	S
NFR.035.S	The system shall allow patients to request prescription re-issuance 24 hours a day, 7 days a week.	S
NFR.040.S	Invoices shall be transferred to external services using secure protocols.	S
NFR.045.S	Invoices shall be transferred to external services using secure protocols.	S
NFR.050.S	Invoices shall facilitate secure communication with to other GP practices using secure protocols.	S
NFR.055.S	Invoices shall facilitate secure communication with to other GP practices 24 hours a day, 7 days a week.	S
NFR.060.S	The system shall provide a user interface that allows the user to reach any page within 5 clicks.	S
NFR.065.S	The system shall allow a user to access their dashboard from any page on the site in one click.	S

3. References

Mavin, A., Wilkinson, P., Harwood, A. and Novak, M. (2009) Easy Approach to Requirements Syntax (EARS). In: 2009 17th IEEE International Requirements Engineering Conference [online]. 2009 17th IEEE International Requirements Engineering Conference (RE). Atlanta, Georgia, USA, IEEE, pp. 317–322. Available from: http://ieeexplore.ieee.org/document/5328509/ [Accessed 7 February 2024].