IT425-1701B-01: Systems Analysis, Design, and Integration

Project Name: FitTrac©

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Week 1: System or Application Overview

Capabilities

The application slated for creation will be a personal fitness management system called ***FitTrac***. FitTrac is a web application that NextGen Fitness will provide as a service to their clientele as a goal setting and tracking tool. FitTrac will allow users to input their workout data and compare their current progress to their goal and review summaries on how well they are performing. The application will host a feature for client's to view custom meal plans that have been created and uploaded by their fitness trainer. Personal trainers and other managers will be able to log into the system and assist their clients while they are away from the gym with all aspects of their fitness goals. Gym members who do not utilize personal training services will still be able to track their own progress, but will not have the added feature of online fitness coaching.

Stakeholders

Primary stakeholders: (Editorial Board, 2016)

- End-users (Franchise clientele)
- Sponsor (NextGen Fitness)
- Project Manager (Crispin Jose)
- Developers
- Technical Writers
- Testers

Secondary stakeholders: (Editorial Board, 2016)

- Sales and Marketing team
- Accounting team

Sponsor

The project will be sponsored by ***NextGen Fitness***, a fitness franchise that is seeking to create a fitness management system for their clientele and expand their market share through the use of proven fitness techniques and current technology.

Week 1: Requirements Specification

FitTrac goals and objectives

- Provide an easy to use system that augments NextGen Fitness clientele training sessions by providing support during their times apart from their trainer
- Create a productivity application that becomes synonymous with the NextGen Fitness mission of "*Fit for the Future*"
- Increase clientele retention rates through tracking activities that clients as well as trainers can view and work together toward achieving the client's fitness goals

Requirements elicitation methods

1. Workshop held with the project manager, developers, secondary stakeholders, and NextGen Fitness project POCs such as directors, managers, and master trainers
2. Questionnaire for members and clients
3. Brainstorming session
4. Use Case modeling
5. Requirements Traceability Matrix (RTM) documentation

Capturing Requirements

Both functional and non-functional requirements will be entered within a *requirements traceability matrix* (*RTM*) (Editorial Board, 2016). The RTM will not only capture requirements, but also be used as a reference during later phases of the SDLC (Editorial Board, 2016).

Functional Requirements (RTM)

RTM FIELD	DESCRIPTION
ID	**FIT001**
Requirement Statement	***The system shall support up to 500 concurrent users per server.***
Priority	3
Source	NextGen Fitness
Risk	Application downtime due to server overload
Opportunity	Support for high concurrent server traffic
Category	Functional - Engineering
Test Acceptance Criteria	Successful simulation of 500 concurrent users per server

RTM FIELD	DESCRIPTION
ID	**FIT002**
Requirement Statement	***The system shall support the creation, editing, and deletion of up to five fitness goals and their corresponding milestone dates as outlined during trainer coaching sessions.***
Priority	8
Source	NextGen Fitness
Risk	Limited functionality and value for applications users
Opportunity	Increased application value for users
Category	Functional - Engineering
Test Acceptance Criteria	Successful creation, editing, and deletion of five sample fitness goals and their corresponding milestone dates

RTM FIELD	DESCRIPTION
ID	**FIT003**
Requirement Statement	***The system shall support the addition and view of fitness activities and their corresponding information by both clients and trainers.***
Priority	9
Source	NextGen Fitness
Risk	Limited functionality and degraded system ability to track activity versus progress toward goal(s) attainment.
Opportunity	Enhanced tracking of fitness activities and their impact on overall goal attainment
Category	Functional - Engineering
Test Acceptance Criteria	Successful addition and view of sample fitness activities and their corresponding information through client and trainer log-in

RTM FIELD	DESCRIPTION
ID	**FIT004**
Requirement Statement	***The system shall support user view, export, and print of up to three custom menu plans that are uploaded by their fitness trainer as outlined during coaching sessions.***
Priority	10
Source	NextGen Fitness
Risk	Limited functionality and Major loss of application value due to the exclusion of a vital pillar of fitness goal attainment
Opportunity	Enhanced tracking of client food intake and supplementation in support of fitness goal attainment
Category	Functional - Engineering
Test Acceptance Criteria	Successful upload of up to three custom menu plans through trainer log-in and successful view, export, and print of uploaded plans through client and trainer log-in

RTM FIELD	DESCRIPTION
ID	**FIT005**
Requirement Statement	***The system shall provide summary views of fitness goal attainment progress and client vital stats. The system shall allow the view and editing of vital stats and the view and export of fitness goals summaries.***
Priority	11
Source	NextGen Fitness
Risk	Limited functionality and major loss of application value for clients that want to view and share their progress with others
Opportunity	Increased application value for users; potential marketing tool through client affiliate interest in program effectiveness
Category	Functional - Engineering, Non-Functional - Sales and Marketing
Test Acceptance Criteria	Successful view and export of sample client progress summaries and successful view and edit of vital stat history.

RTM FIELD	DESCRIPTION
ID	**FIT006**
Requirement Statement	***The system shall provide a feature for clients to upload, change, and delete an image of their choosing to serve as a profile picture.***
Priority	12
Source	NextGen Fitness
Risk	Minimal loss of application value
Opportunity	Minor increased value through the addition of a user customization option
Category	Functional - Minor extra features
Test Acceptance Criteria	Successful upload, change, and deletion of a sample image through the client log-in

RTM FIELD	DESCRIPTION
ID	**FIT007**
Requirement Statement	***The system shall provide a feature that will cycle through a list of up to 50 random inspirational quotes to provide client motivation.***
Priority	14
Source	Development team
Risk	Minimal to no loss of application value
Opportunity	Minor increased value through the addition of a motivational tools
Category	Functional - Minor extra features
Test Acceptance Criteria	Successful upload and cycle through a list of 50 inspirational quotes.

RTM FIELD	DESCRIPTION
ID	**FIT008**
Requirement Statement	***The system shall provide a feature that will cycle through a list of up to 10 random NextGen Fitness related images to provide client motivation and reinforce branding.***
Priority	13
Source	Sales and Marketing team
Risk	Minor loss of application value; Major loss of NextGen Fitness brand reinforcement
Opportunity	Minor increased value through the addition of a motivational tool; Major increased value through brand reinforcement
Category	Functional - Major extra features
Test Acceptance Criteria	Successful upload and cycle through a list of 10 NextGen Fitness related images.

Non-Functional Requirements (RTM)

RTM FIELD	DESCRIPTION
ID	**FIT009**
Requirement Statement	***The system shall be accessible only via a registered and properly authenticated client, trainer, or manager account log-in***
Priority	4
Source	Development team
Risk	Major security vulnerability of personal client information, NextGen Fitness business rules, and development company code
Opportunity	Increased application security measures for stakeholders
Category	Non-Functional - Security
Test Acceptance Criteria	Successful registration and log-in of test client, trainer, and manager accounts. Unsuccessful log-in and temporary lock-out after four failed attempts at account authentication.

RTM FIELD	DESCRIPTION
ID	**FIT010**
Requirement Statement	***The system shall support PC and Mac OS users.***
Priority	6
Source	NextGen Fitness
Risk	Compatibility issues for users with unsupported OS
Opportunity	Access to larger user base due to multiple OS compatibility
Category	Non-Functional - Usability
Test Acceptance Criteria	Successful application usage with PC and Mac OS supported systems.

RTM FIELD	DESCRIPTION
ID	**FIT011**
Requirement Statement	***The system shall be a web application designed with 3-tier architecture - utilizing technologies such as HTML, PHP, JavaScript, MySQL, and Java.***
Priority	5
Source	Source: Development team
Risk	Lack of scalability will create a shortened overall product life cycle
Opportunity	Scalability for future versions and cost decrease through use of open source technologies
Category	Technology (assumptions)
Test Acceptance Criteria	Successful system deployment and use in a 3-tiered architectural environment.

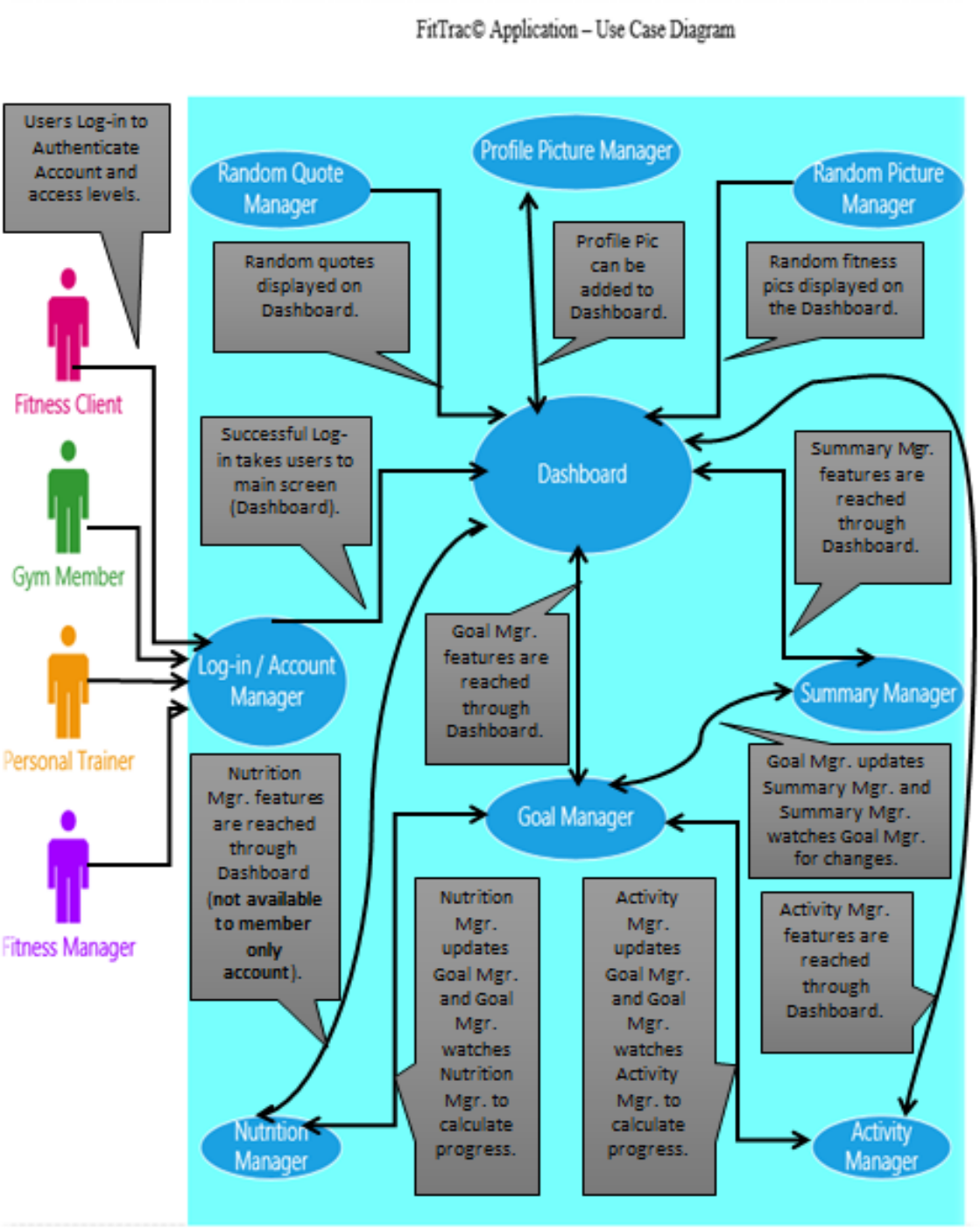
RTM FIELD	DESCRIPTION
ID	**FIT012**
Requirement Statement	***The system shall not provide menu planning and trainer support for users who are not actively utilizing personal training services.***
Priority	7
Source	NextGen Fitness
Risk	Loss of sponsor revenue due to members having access to features that will decrease the need for personal training services.
Opportunity	Promotion of the menu planning and trainer support features as part of the purchase of personal training services.
Category	Non-Functional - Major extra feature (assumptions)
Test Acceptance Criteria	Client access to menu and trainer support features. Lack of access to menu and trainer support features for members not utilizing personal training services.

RTM FIELD	DESCRIPTION
ID	**FIT013**
Requirement Statement	***The system shall be fully-functional and deployed within an 18 month time frame.***
Priority	2
Source	NextGen Fitness, Project Manager, Accounting team
Risk	Loss of sponsor revenue and clientele increase, Negative impact to development company reputation.
Opportunity	To become the preferred development company for sponsor solution needs and positive impact to development company reputation.
Category	Non-Functional - Timetables (constraints)
Test Acceptance Criteria	Fully-functional system delivered on or before the 18 month deadline.

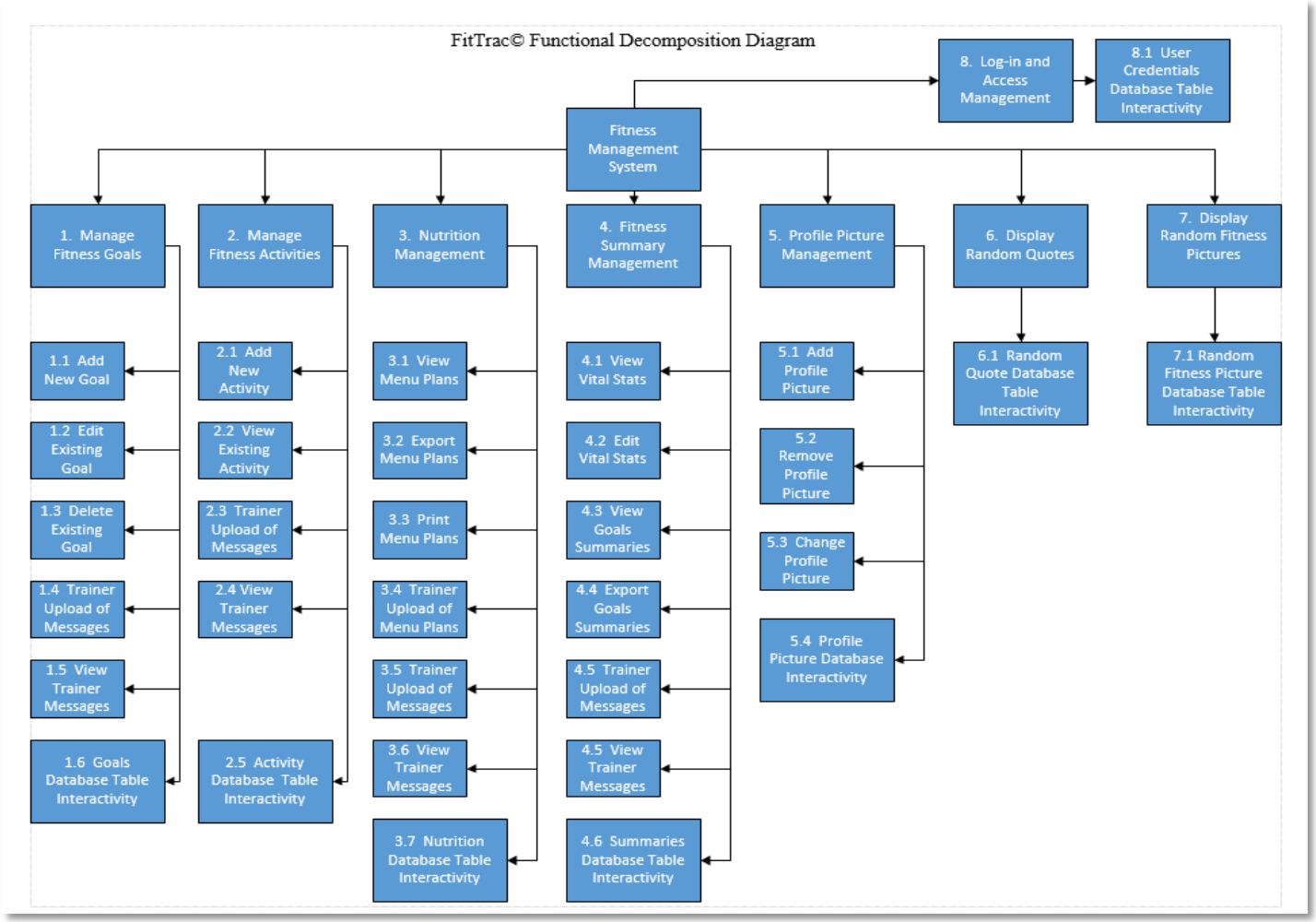
RTM FIELD	DESCRIPTION
ID	**FIT014**
Requirement Statement	***The system shall be completed within an allotted project budget of $800,000.***
Priority	1
Source	NextGen Fitness, Project Manager, Accounting team
Risk	Increased costs for sponsor, negative impact to development company reputation
Opportunity	To become the preferred development company for sponsor solution needs and positive impact to development company reputation.
Category	Non-Functional - Financials (constraints)
Test Acceptance Criteria	Fully-functional system delivered under the $800,000 budget

Week 2: System or Application Design

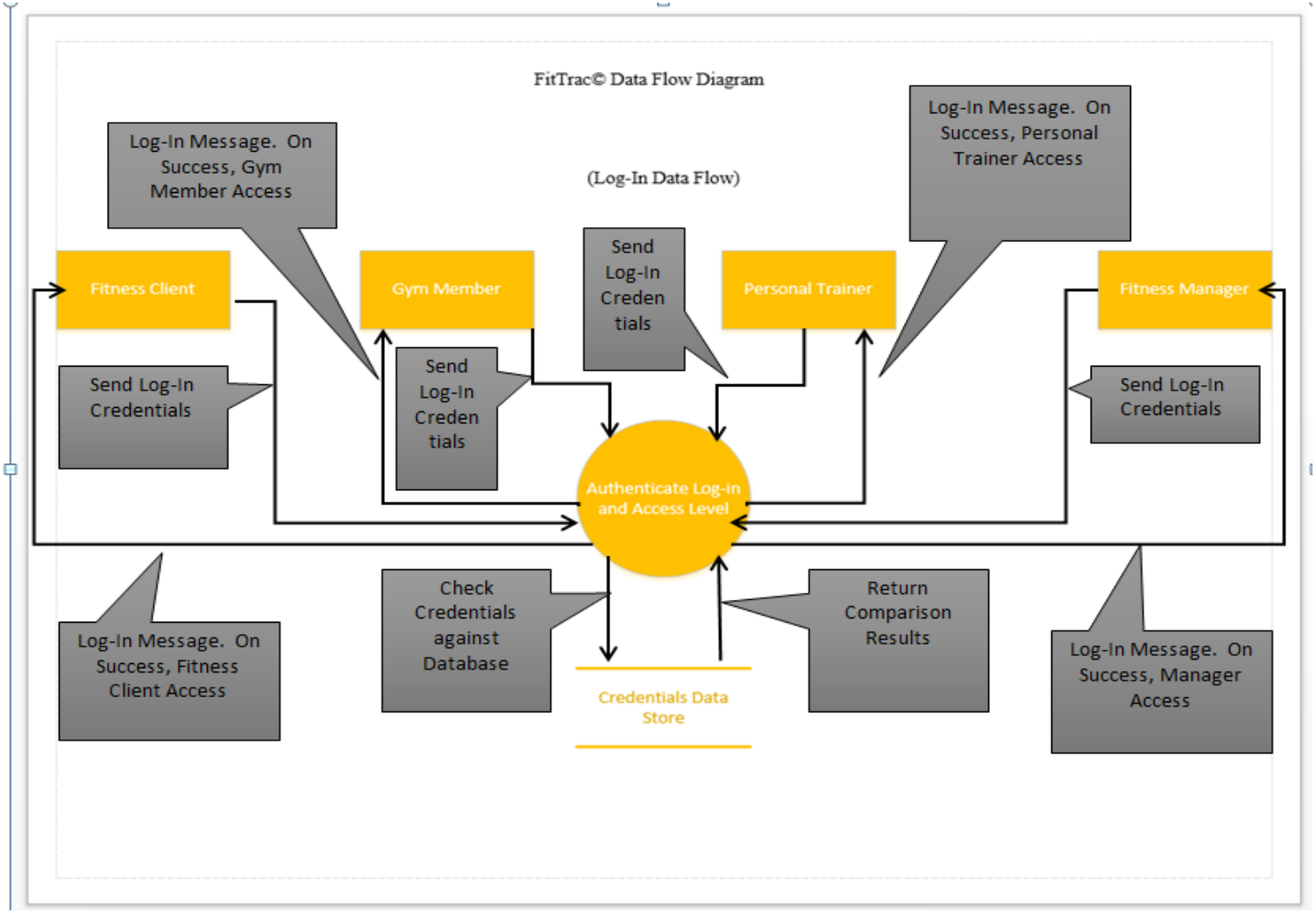
Use Case Diagram



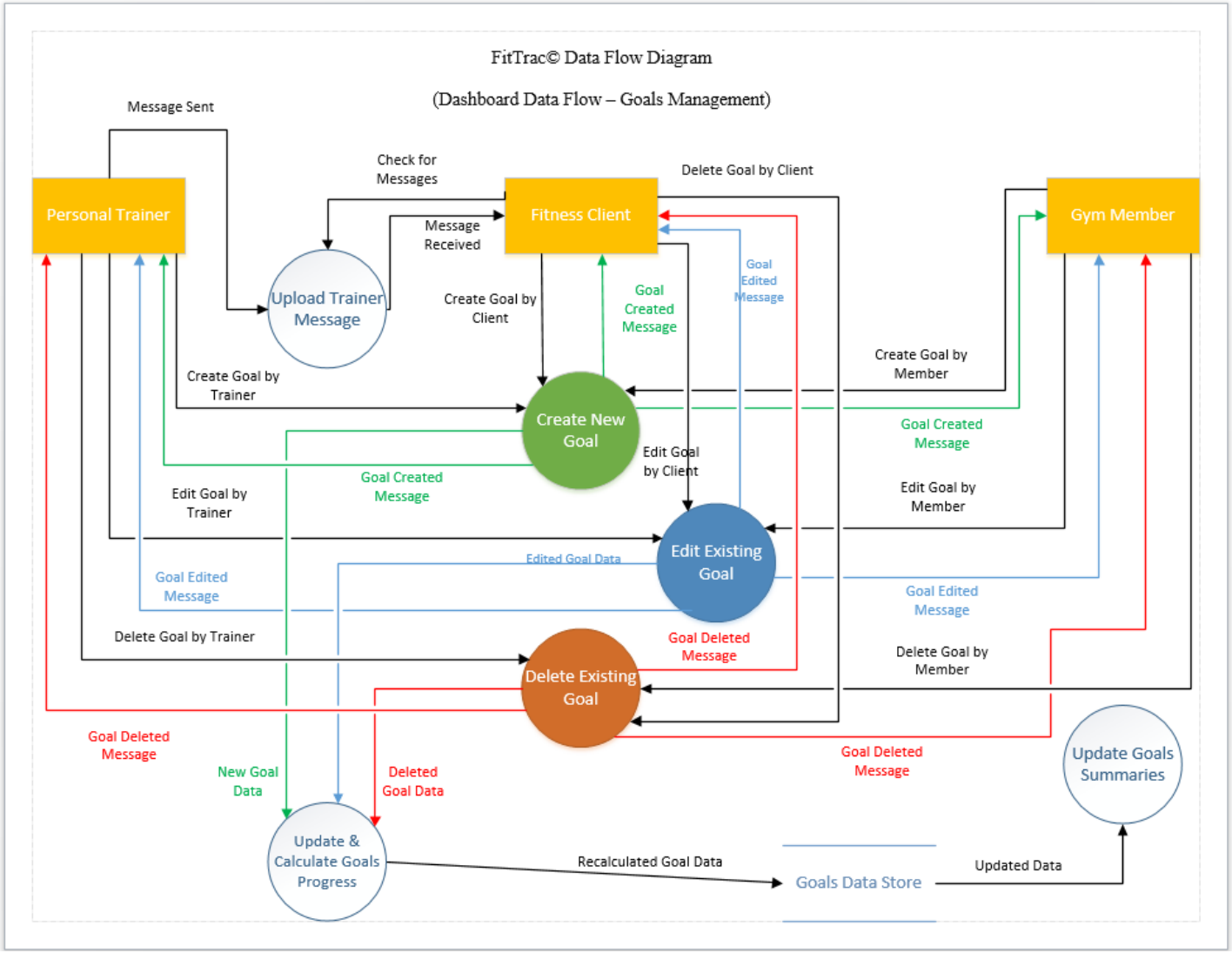
Functional Decomposition Diagram



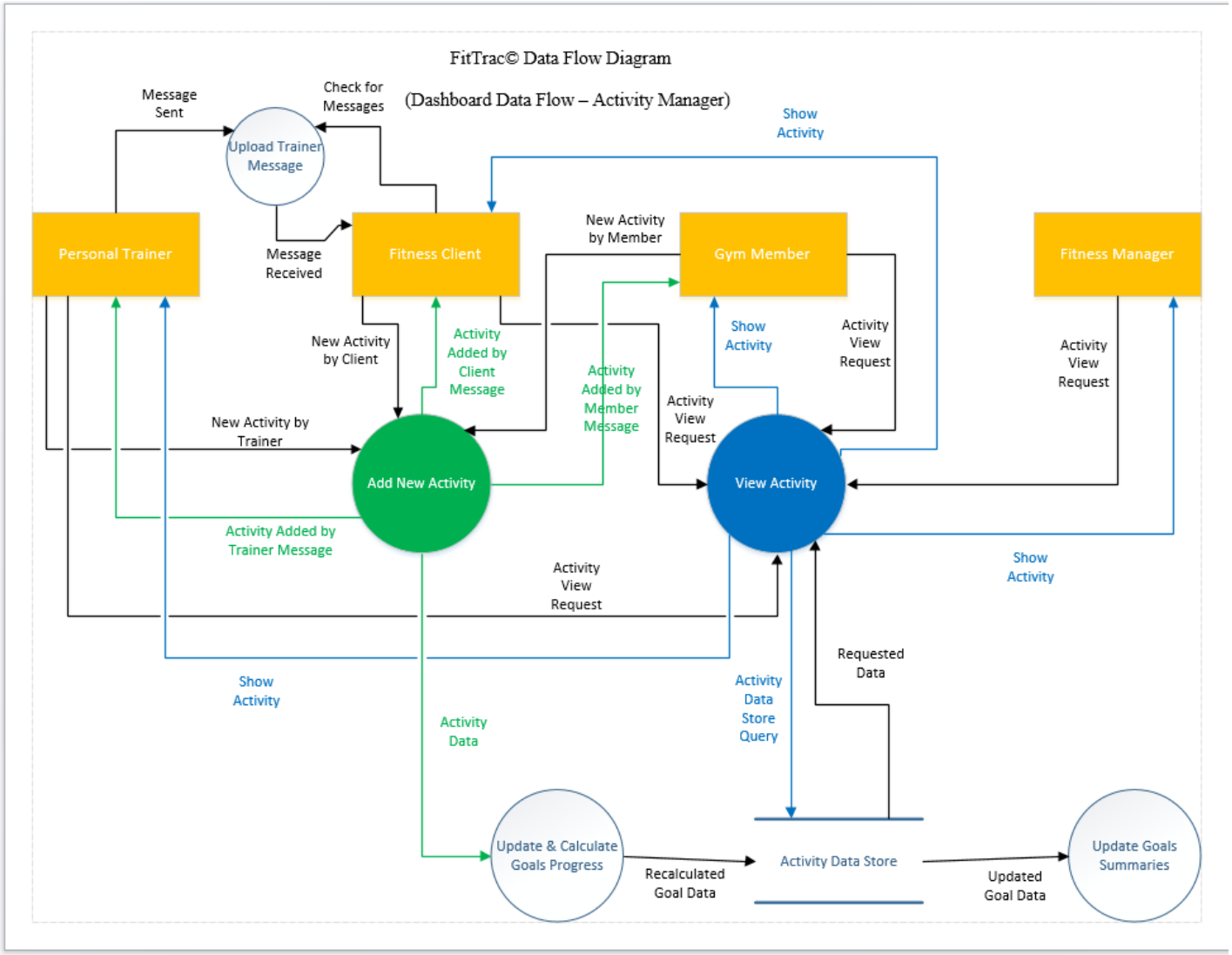
Log-In Data Flow Diagram



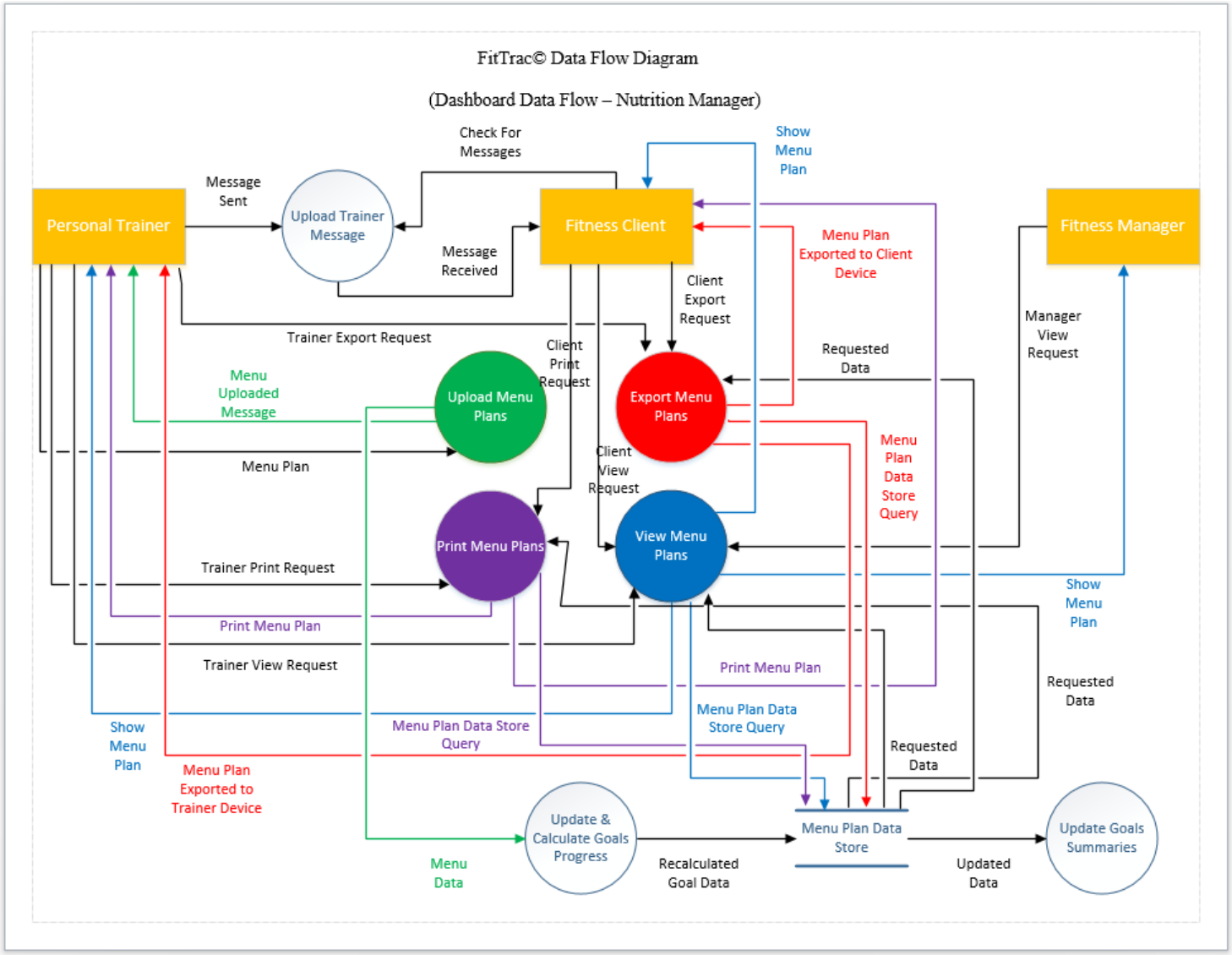
Goal Manager Data Flow Diagram



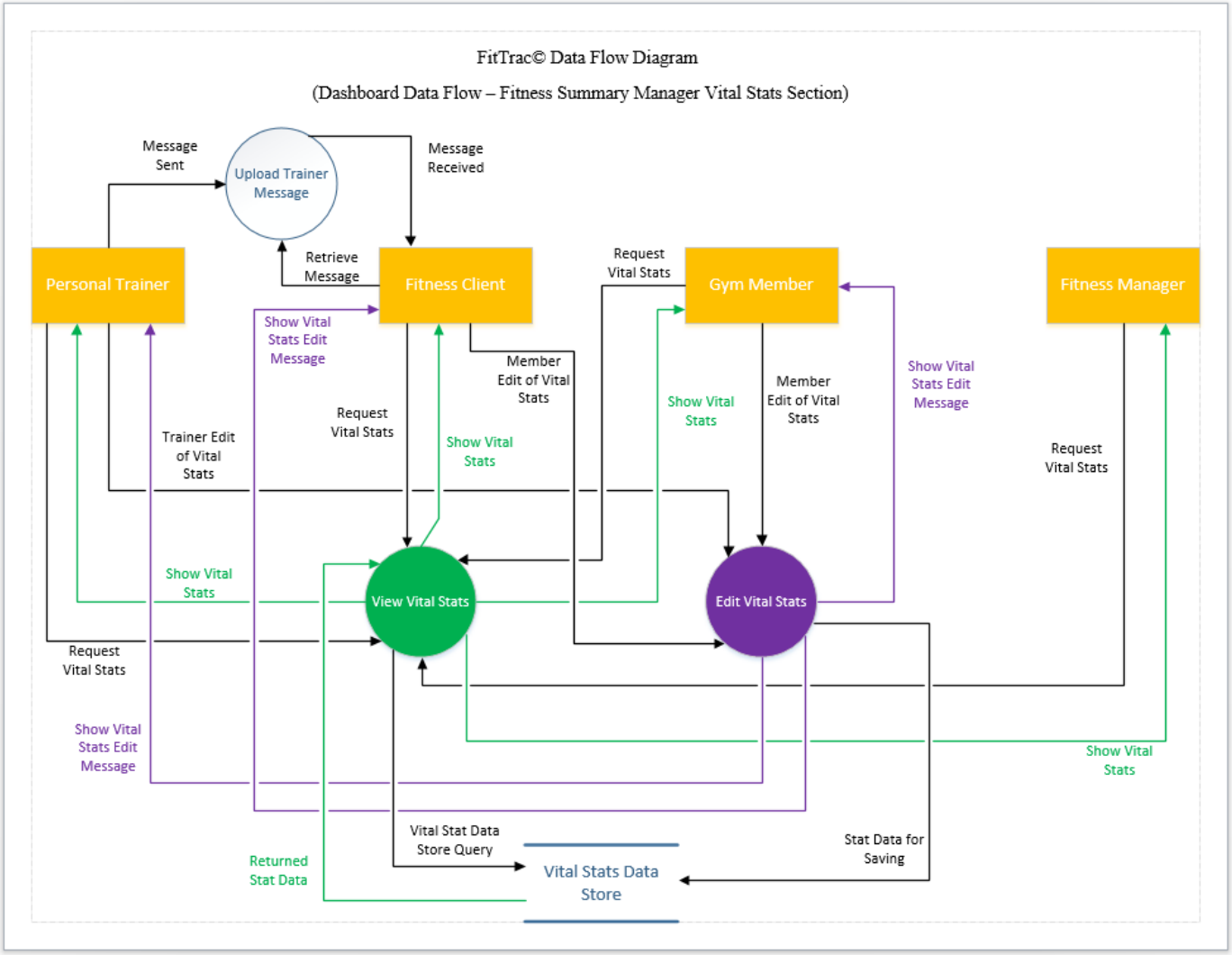
Activity Manager Data Flow Diagram



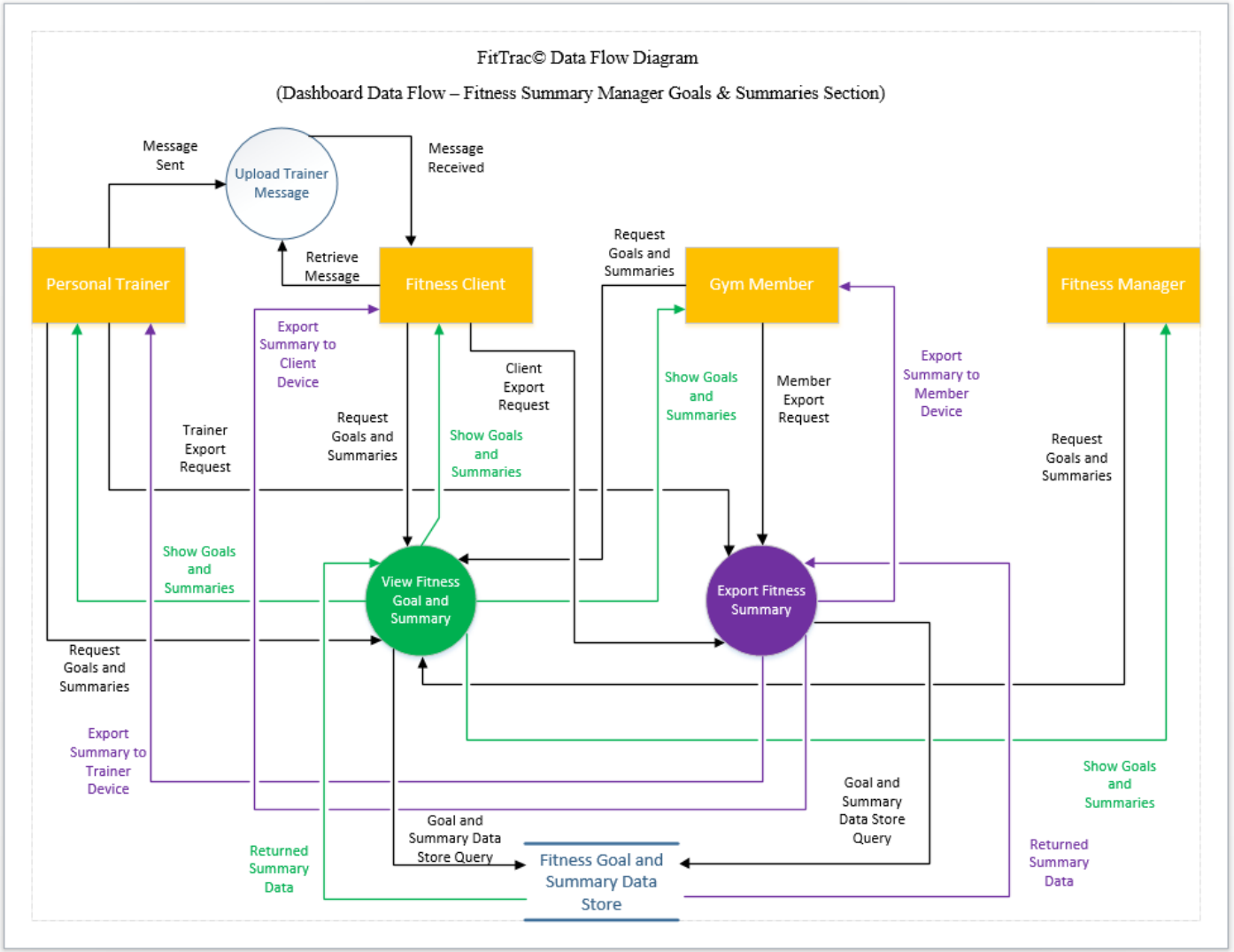
Nutrition Manager Data Flow Diagram



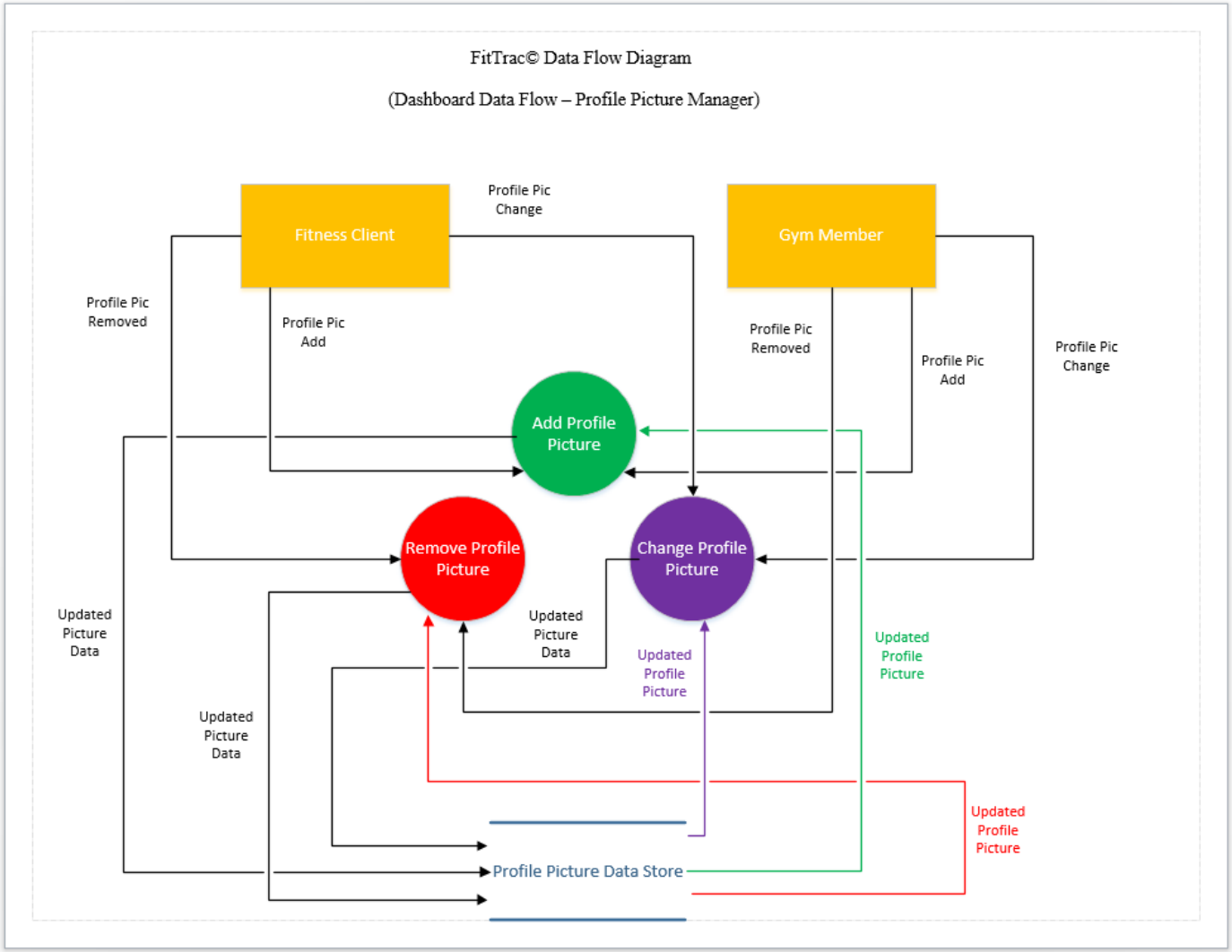
Fitness Summary Manager Part I – Vital Stats Data Flow Diagram



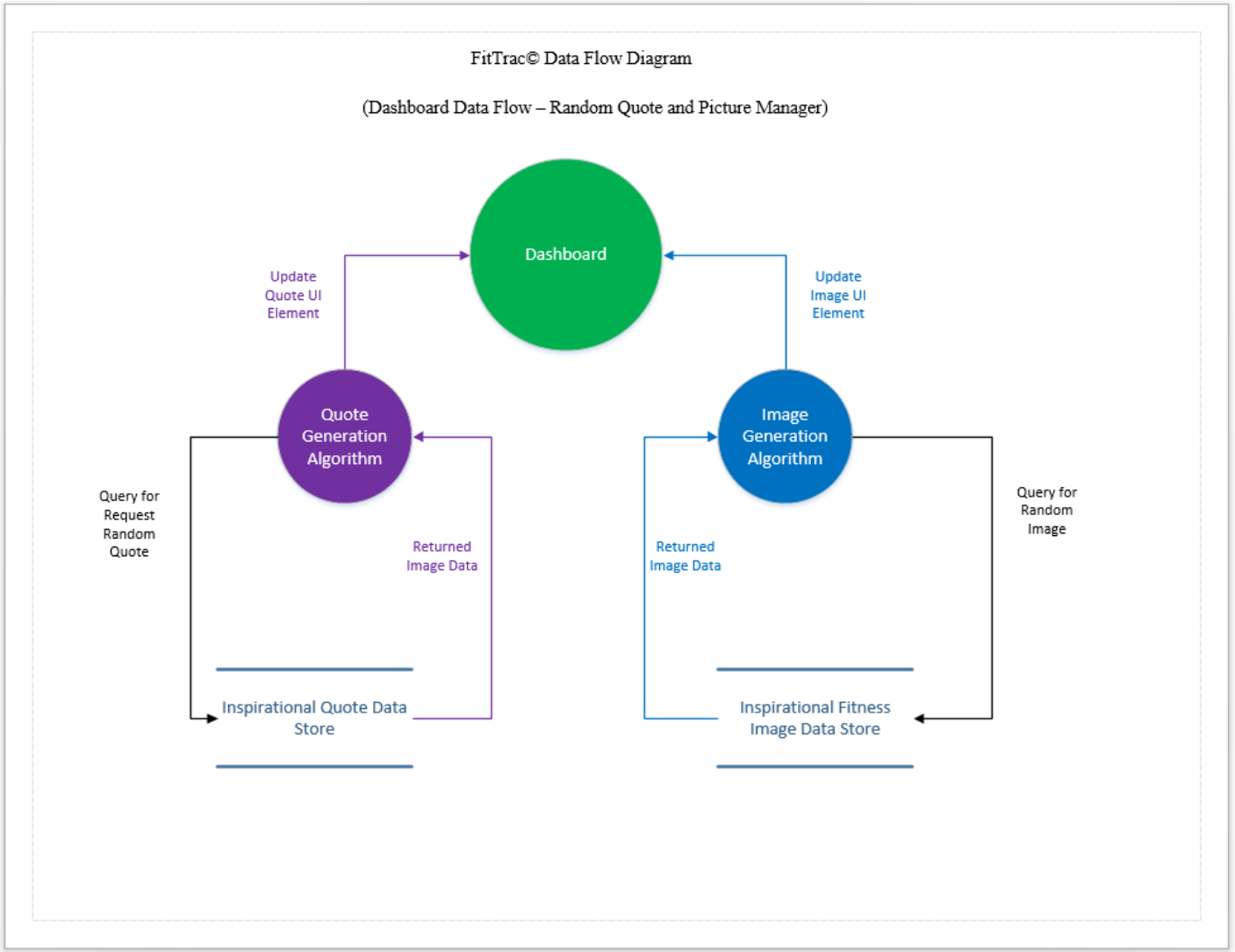
Fitness Summary Manager Part II – Goals & Summaries Data Flow Diagram



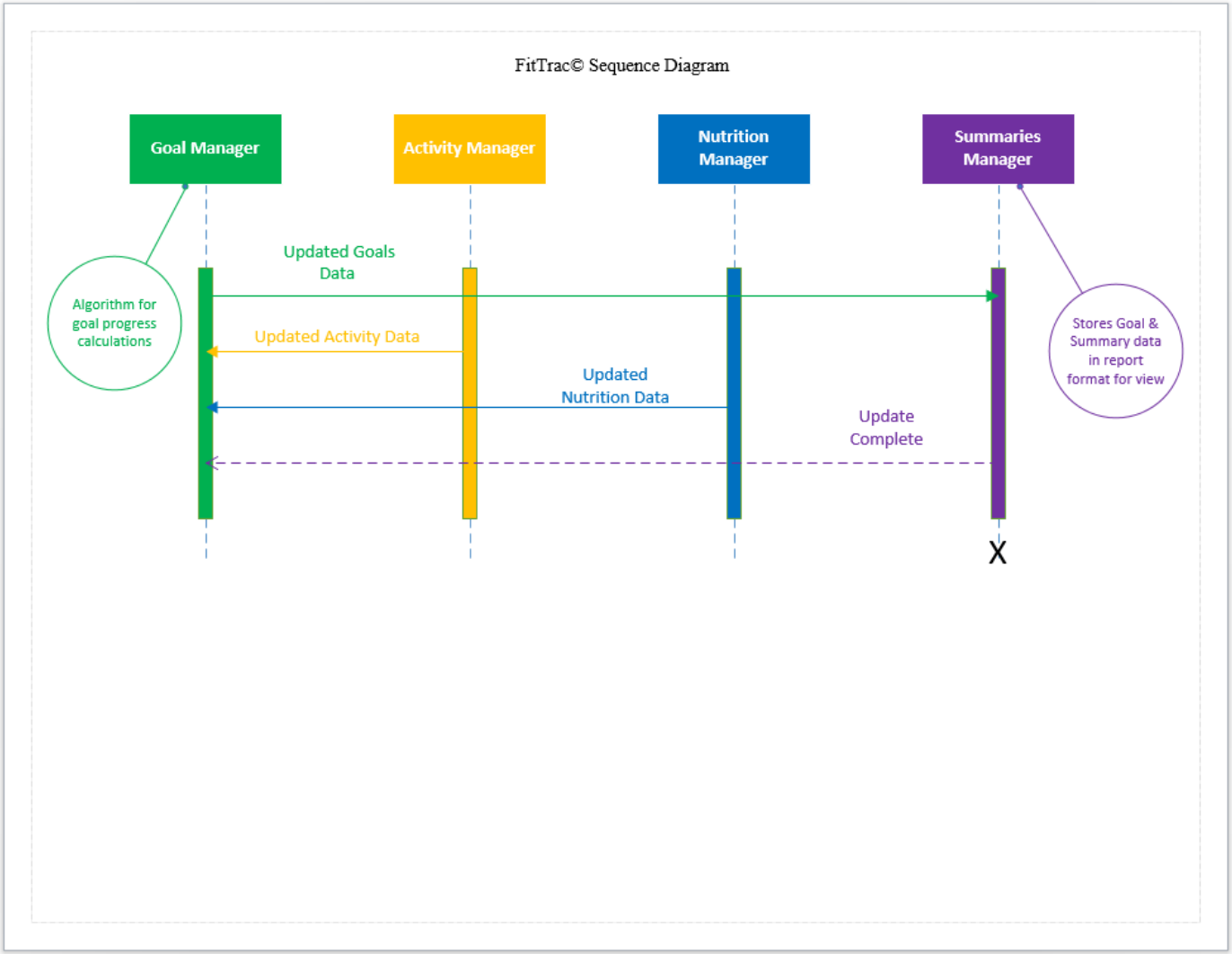
Profile Picture Manager Data Flow Diagram



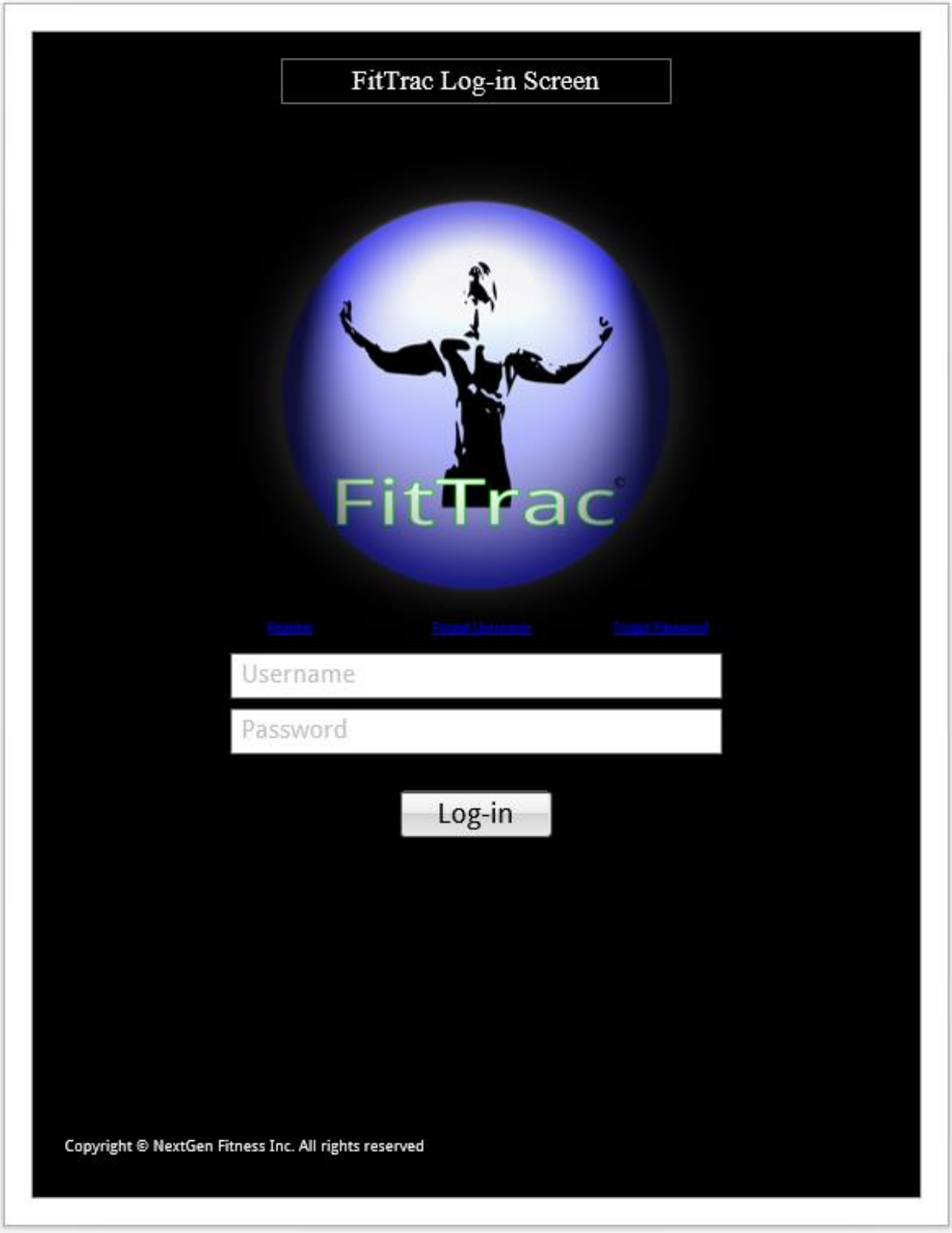
Random Quote & Picture Manager Data Flow Diagram



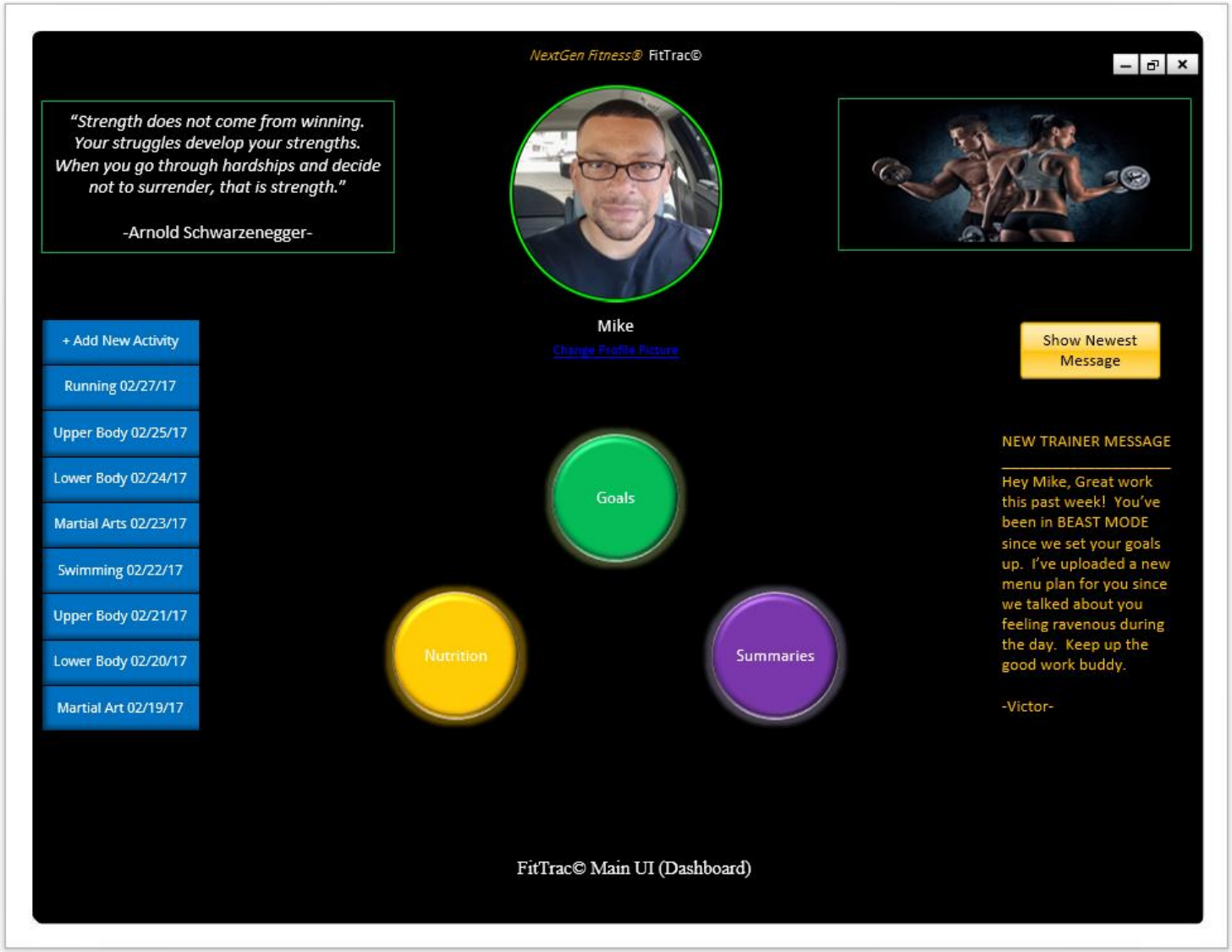
Sequence Diagram



High-Level UI (Log-in)



High-Level UI (Dashboard)



Week 3: Test and Quality Assurance Plan

Quality Assurance Plan

Introduction

This document will serve as the quality assurance (QA) plan for the FitTrac© project. This comprehensive plan will cover the following project areas:

- **QA Team Selection** (Editorial Board, 2016)
- **Scope of QA within each phase** (Editorial Board, 2016)

Meeting timeline and budget constraints will be critical to the success of the software project. In order to ensure that development is conducted in an efficient and effective manner, the QA plan shall be the compass by which all teams will navigate each project phase and define the criteria for meeting "high quality" standards. If for any reason there is a disparity between this document and project requirements, teams shall consult their leads for guidance in all matters of QA. Team leads will report these contradictions to the QA Manager who will notify the management team in order to reconcile the issue(s).

QA Team Selection

QA Team Roles	QA Team Duties
QA Manager	Must hold the position of Project Manager. Overall in charge of the QA team. Reports progress and findings to the management team weekly. Holds final approval / disapproval authority for project phase entrance / exit.
Gold Team Lead	Must hold the position of Sr. Software Engineer or System Architect. Leads the gold team in the assessment of project compliance with functional requirements. Reports progress and findings to the QA Manager daily.
Gold Team Member 1	Holds the position of Software Engineer or Developer. Reports progress and findings to Team Lead daily.
Gold Team Member 2	Holds the position of Software Engineer or Developer. Reports progress and findings to Team Lead daily.
Gold Team Member 3	Holds the position of Software Tester. Reports progress and findings to Team Lead daily.
Blue Team Lead	Must hold the position of Sr. Software Engineer or Systems Architect. Leads the blue team in the assessment of project compliance with non-functional requirements. Reports progress and findings to the QA Manager daily.
Blue Team Member 1	Holds the position of Software Engineer or Developer. Reports progress and findings to Team Lead daily.
Blue Team Member 2	Holds the position of Software Engineer or Developer. Reports progress and findings to Team Lead daily.
Blue Team Member 3	Holds the position of Technical Writer. Reports progress and findings to Team Lead daily.

Scope

Planning and Requirements Analysis Phase

During this phase, QA team members will be selected in accordance with plan criteria. QA methods and controls that will be implemented will be selected for each of the following phases as well as the setting of checkpoints and milestones. QA audits, review, and testing standards will be determined and documented.

Requirements Definition Phase (Milestone 'A')

Documentation: Requirements Traceability Matrix

Method: QA audit

QA blue and gold team members shall audit the RTM in accordance with checklists and their area of responsibility. Each checklist shall be serialized with a check point ID number. These audits will ensure that requirements are clear, detailed, and contain testing success criteria. Once an audit is complete, checklists shall be passed to team leads for review. After reviewing the checklists, leads shall pass audit findings along with a copy of the RTM to the QA Manager who will give a final analysis of 'PASS' or 'FAIL' for the milestone. Audit results shall be reported to the management team and a determination will be made for exit or retention in the current phase.

RTM Audit Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKA001**		
Requirement Statement	Requirements statements are definitive. Statements address specific stakeholder requirements.		
Priority	A priority number is present and is not a duplicate.		
Source	Source is present and conforms to a primary or secondary stakeholder.		
Risk	Risk assessment is clear and unambiguous		
Opportunity	Opportunity assessment is clear and unambiguous.		
Category	Category listed falls under a functional or non-functional requirement.		
Test Acceptance Criteria	Acceptance criteria are specific, measurable, and can be answered with 'Yes' or 'No'.		

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

Design Phase (Milestone 'B')

Documentation: Diagrams

Method: QA Audit

QA team members shall audit all project diagrams in accordance with checklists. Each checklist shall be serialized with a check point ID number. These audits will ensure that diagrams are graphically logical, detailed, and address the specific function of the system. Once an audit is complete, checklists shall be passed to team leads for review. After reviewing the checklists, leads shall pass audit findings along with copies of diagrams to the QA Manager who will give a final analysis of 'PASS' or 'FAIL' for the milestone. Audit results shall be reported to the management team and a determination will be made for exit or retention in the current phase.

Diagram Audit Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKB001**		
Use Case Diagram	Diagram contains appropriate actors and systems. Actor and sub-system interaction are logical and clear. Interactions have call-outs with amplifying information related to their flow of data.		
Functional Decomposition Diagram	Diagram systems and sub-systems are numbered and demonstrate correct parent/ child relationships.		
Data Flow Diagrams	Diagrams are named for their purpose or function. External entities, processes, and data stores are labeled. Data flow between entities, processes, and data stores is logical. Data flow has call-out or amplifying information related to its purpose.		
Sequence Diagram	Diagram is named. Entities are labeled. Events are logical and have call-outs or amplifying information related to their purpose.		
UI Mock-ups			

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

Development and Implementation Phase (Milestone 'C')

Documentation: Pseudocode, programming documentation
Method: QA Review

QA team members shall conduct a review of all project pseudocode and programming documentation in accordance with checklists. Each checklist shall be serialized with a check point ID number. These reviews will ensure that coding documentation is logical, detailed, and addresses the specific function of the system. Once a review is complete, checklists shall be passed to team leads for review. After reviewing the checklists, leads shall pass review findings along with copies of coding documentation to the QA Manager who will give a final analysis of 'PASS' or 'FAIL' for the milestone. Review results shall be reported to the management team and a determination will be made for exit or retention in the current phase.

Code Review Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKC001**		
Pseudocode	Pseudocode is clear and contains meaningful comments. Code branching is logical and covers cases for all decisions. Algorithms are correct and logically verifiable.		
Design patterns	Code follows the appropriate design patterns for each class or interface.		
Architecture	Separation of concerns in the code is clear and loosely coupled.		

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

Testing Phase (Milestone 'D')

Documentation: RTM, coding documentation, Data Flow, Sequence, and Functional Decomposition diagrams, Test Case Matrices (Guru99, Copyright 2017), Test plans

Method: Testing, QA validation and verification, QA Audit

After testing is complete, QA team members shall perform validation and verification on the project in accordance with checklists. Team members shall also conduct audits on test case matrices and test plans by means of their corresponding checklists. Each checklist shall be serialized with a check point ID number. These audits along with validation and verification will ensure that all RTM requirements were met by each test case and that the software adheres to design plans (Editorial Board, 2016). Once audits, verifications, and validations are complete, checklists shall be passed to team leads for review. After reviewing the checklists, leads shall pass their findings along with copies of test case matrices to the QA Manager who will give a final analysis of 'PASS' or 'FAIL' for the milestone. Results shall be reported to the management team and a determination will be made for exit or retention in the current phase.

Unit Test Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKD001**		
Inputs	Methods accept data from automated tests		
Transformations	Methods perform calculations as per design		
Outputs	Methods display the correct information as per design		

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

Functional Test Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKD002**		
Goals Functions	Goals can be created, edited, and deleted; Goals manager send updates to summary manager in real time		
Nutrition Functions	Menu plans can be uploaded, exported, viewed, and printed; Member accounts have no access to this function		
Summary Functions	Summaries can be viewed and exported; Vital Stats can be edited and viewed		
Activity Functions	Activities can be added and viewed; Activity wizard is easy to follow and all fields can be updated with the correct data		
Profile Picture Functions	Profile pictures can be uploaded, changed, and deleted		
Log-in Functions	Log-in is easy to understand and functions according to design		
Random Quote Generator	Random quotes are clear and properly formatted.		
Random Picture Generator	Random pictures are not pixelated, are clear, and of correct size		
Account Registration Functions	An account can be created with the appropriate access levels based on access code		

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

GUI Test Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKD003**		
Functionality	UI elements perform as designed		
Color Scheme	Color scheme fits with requirements		
Readability	Font is consistent with style and requirements		

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

Security Test Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKD004**		
Log-in Functions	Registered accounts can successfully log-in to the system; Disabled accounts or incorrect credentials do not allow access		
Forms Security	Forms do not allow the injection of code		

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

Stress Test Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKD005**		
High-Load System Behavior	System maintains expected performance levels under max user load		

FINAL ANALYSIS	
TOTAL MET	
TOTAL NOT MET	
Milestone PASS / FAIL	

NOTES

User Acceptance Test Checklist

CHECK POINT FIELDS	DESCRIPTION	MEETS CRITERIA	DOES NOT MEET CRITERIA
ID	**CHKD006**		
Function	Software functions according to requirements		
Form	UX experience was good to satisfactory		
FINAL ANALYSIS			
TOTAL MET			
TOTAL NOT MET			
Milestone PASS / FAIL			
NOTES			

Unit Test Plan

Documentation: Data Flow and Sequence Diagrams, Test Case Matrix (Guru99, Copyright 2017), coding documentation

Methods: Class method, automated testing

Software testers shall conduct unit tests on various classes and methods in order to uncover defects that have occurred during the coding stages (Editorial Board, 2016). Testing shall be conducted accordance with test checklists. Once testing results are available, copies of the checklists will be forwarded to QA team leads and project managers for review.

Unit Test Case Matrix

Test Case ID	Requirement ID	Test Case	Test Steps	Test Data	Expected Results
UT1	**FIT002**	Call createGoal()	Run automated test to call method	Sample values assigned to variables via automated test	Values assigned with no errors or anomalies
UT2	**FIT002**	Call editGoal()	Run automated test to call method	Sample values changed and assigned to variables via automated test	Values changed and assigned with no errors or anomalies
UT3	**FIT002**	Call deleteGoal()	Run automated test to call method	Sample values assigned via automated test	Variable values deleted
UT4	**FIT003**	Call addActivity()	Run automated test to call method	Sample values assigned to variable via automated test	Values assigned with no errors or anomalies
UT5	**FIT003**	Call viewActivity()	Run automated test to call method	Variable assignments via automated test	Sample activities displayed with no errors or anomalies
UT6	**FIT004**	Call uploadMenu()	Run automated test to call method	Sample plan via automated test	Sample menu uploaded to menu class object with no errors or anomalies
UT7	**FIT004**	Call viewMenu()	Run automated test to call method	Sample plan via automated test	Sample menu displayed with no errors or anomalies

UT8	**FIT004**	Call exportMenu()	Run automated test to call method	Sample plan via automated test	Menu exported to device with no errors or anomalies
UT9	**FIT004**	Call printMenu()	Run automated test to call method	Sample plan via automated test	Print job sent to device, menu printed with no errors or anomalies
UT10	**FIT005**	Call editStats()	Run automated test to call method	Sample stats assigned via automated test	Values changed and assigned with no errors or anomalies
UT11	**FIT005**	Call viewStats()	Run automated test to call method	Sample stats assigned via automated test	Stats displayed with no errors or anomalies
UT12	**FIT005**	Call viewFitSum()	Run automated test to call method	Goal input variables assigned via automated test	Summary displayed with no errors or anomalies
UT13	**FIT005**	Call exportFitSum()	Run automated test to call method	Sample goal summary via automated test	Summary values exported to device with no errors or anomalies
UT14	**FIT006**	Call addProfPic()	Run automated test to call method	Sample image assigned via automated test	Image uploaded to Profile Pic class object with no errors or anomalies
UT15	**FIT006**	Call changeProfPic()	Run automated test to call method	Sample image assigned via automated test	Image changed with no errors or anomalies
UT16	**FIT006**	Call deleteProfPic()	Run automated test to call method	Sample image assigned via automated test	Image deleted

UT17	**FIT007**	Call randQuote()	Run automated test to call method	Quotes from quote database	Random quotes displayed until loop exit with no errors or anomalies
UT18	**FIT008**	Call randFitPic()	Run automated test to call method	Fitness images from image database	Random pictures displayed until loop exit with no errors or anomalies
UT19	**FIT009**	Call createAcct()	Run automated test to call method	Sample values assigned to variables via automated test	Account created and values assigned with no errors or anomalies

System Testing Plan

Documentation: RTM, Data Flow, Sequence, and Functional Decomposition Diagrams, Test Case Matrices (Guru99, Copyright 2017)

Methods: GUI, Functional, Stress and Security testing

Software testers shall test GUI elements to ensure their planned functionality and ease of use for the end-user (Editorial Board, 2016). Functional tests shall correlate to the capabilities of the application as a whole (Editorial Board, 2016). Stress tests shall be conducted to observe that the system can handle the planned maximum load of concurrent users (Guru99, Copyright 2017). Security testing aims to find vulnerabilities in various areas of the software (Guru99, Copyright 2017). Testing shall be conducted accordance with RTM requirements and test checklists. Once testing results are available, copies of the checklists will be forwarded to QA team leads and project managers for review.

Functional Test Case Matrix

Test Case ID	Requirement ID	Test Case	Test Steps	Test Data	Expected Results
ST1	**FIT002**	Create a fitness goal	1) Click 'Goals' button 2) After Goals sub menu buttons appear, click 'New Goal' 3) Enter information in the required fields of the goals wizard 4) Click the 'Complete' button to save goals information	Goal title = Lose 10lbs in 60 days Goal type = Weight loss Goal time = 60 days	Goal successfully created
ST2	**FIT002**	Edit a fitness goal	1) Click 'Goals' button 2) After Goals sub menu buttons appear, click 'Edit Goal' 3) Select goal to be edited – "Lose 10lbs. in 60 days" 4) Changed desired goals information 5) Click 'Complete' button to save new goal information	Goal title = Lose 10lbs in 45 days Goal time = 45 days	Goal successfully edited

ST3	**FIT002**	Delete a fitness goal	1) Click ‘Goals’ button 2) After Goals sub menu buttons appear, click ‘Delete Goal’ 3) Select goal to be deleted – “Lose 10lbs. in 45 days” 4) Click ‘Delete’ button 5) Click ‘Yes’ button to confirm that the goal is to be deleted	None	Goal successfully deleted
ST4	**FIT003**	Add a fitness activity	1) Click ‘Add Activity’ button 2) Input activity data into correct forms via the activity wizard 3) Click ‘Complete’ button to save new goal information	Activity title = Running Activity date = 02/02/2017 Activity duration = 60 mins. Activity distance = 7 miles Activity notes = “Felt great this time”	Activity successfully created
ST5	**FIT003**	View a fitness activity	1) Click on a created activity button in the activities panel	None	Activity information successfully displayed

ST6	**FIT004**	Upload a menu plan	1) Log-in to trainer account 2) Select the intended client account for the menu 3) Click upload ‘Upload Plan’ button 4) Navigate to menu plan on device and single click to select 5) Click ‘Okay” button to finalize the upload	Sample menu plan	Menu plan successfully uploaded to client account
ST7	**FIT004**	View a menu plan	1) Log-in to client account 2) Click the ‘Nutrition’ button 3) After Nutrition sub menu buttons appear, click ‘View Menus’ button 4) Click the desired menu icon	Sample menu plan	Menu plan successfully displayed
ST8	**FIT004**	Export a menu plan	1) Log-in to client account 2) Click the ‘Nutrition’ button 3) After Nutrition sub menu buttons appear, click ‘Export Menus’ button 4) Click the desired menu icon	Sample menu plan	Menu plan successfully exported to device
ST9	**FIT004**	Print a menu plan	1) Log-in to client account 2) Click the ‘Nutrition’ button 3) After Nutrition sub menu buttons appear, click ‘Print Menus’ 4) Click the desired menu icon 5) Click the ‘Print’ button 6) Select installed printer 7) Click ‘Okay’ button	Sample Menu Plan	Print job sent to printer, Menu plan successfully printed

ST10	**FIT005**	Edit vital stats	1) Log-in to client or member account 2) Click the ‘Summaries’ button 3) After Summaries sub menu buttons appear, click ‘Edit Stats’ button 4) Input stats into correct forms 5) Click ‘Complete’ button to save stats information	Resting Heart Rate = 50 bpm Body Fat (%) = 15 Total Weight (lbs.) = 210 Basal Metabolic Rate (kcal) = 1780	Vital Stats successfully edited
ST11	**FIT005**	View vital stats	1) Log-in to client or member account 2) Click the ‘Summaries’ button 3) After Summaries sub menu buttons appear, click ‘View Vital Stats’ button	Sample Stats	Vital Stats successfully displayed
ST12	**FIT005**	View fitness summary	1) Log-in to client or member account 2) Click the ‘Summaries’ button 3) After Summaries sub menu buttons appear, click ‘View Fitness Summary’ button	Sample summary from goals input	Fitness Summary successfully displayed

ST13	**FIT005**	Export fitness summary	1) Log-in to client or member account 2) Click the ‘Summaries’ button 3) After Summaries sub menu buttons appear, click ‘Export Summary’ button	Sample summary from goals input	Fitness Summary successfully exported to device
ST14	**FIT006**	Upload a profile image	1) Log-in to client or member account 2) Click the ‘Change Profile Picture’ link 3) When the profile picture menu is displayed, click the ‘Upload Image’ button 4) Navigate to the desired image and click to select 5) Click ‘Okay’ button to finalize the upload	Sample image	Profile Picture successfully uploaded

ST15	**FIT006**	Change a profile image	1) Log-in to client or member account 2) Click the ‘Change Profile Picture’ link 3) When the profile picture menu is displayed, click the ‘Change Image’ button 4) Navigate to the desired image and click to select 5) Click ‘Okay’ button to finalize the upload	New sample image	Profile Picture successfully changed to new image
ST16	**FIT006**	Delete a profile image	1) Log-in to client or member account 2) Click the ‘Change Profile Picture’ link 3) When the profile picture menu is displayed, click the ‘Delete Image’ button	Sample image	Profile Picture successfully deleted

ST17	**FIT009**	Create a client account	1) In web browser, enter www.nextgenfitness.com/fitfitt/login 2) On the Log-in window, click the 'Register' link 3) Enter data into required fields 4) Click 'Okay' button to finalize account creation 5) Log-in with user name and password for account	First name = Sample Last name = Client D.O.B. = 04/19/1994 Address = 12345 Sample Dr. City = Houston State = TX Zip code = 77034 Username = Client001 Password = P@55w0rd! Client ID = NGFC001	Client account successfully created
ST18	**FIT009**	Create a trainer account	1) In web browser, enter www.nextgenfitness.com/fitfitt/login 2) On the Log-in window, click the 'Register' link 3) Enter data into required fields 4) Click 'Okay' button to finalize account creation 5) Log-in with user name and password for account	First name = Super Last name = Trainer D.O.B. = 11/11/1981 Address = 54321 Sample Blvd City = Houston State = TX Zip code = 77564 Username = Trainer001 Password = P@55w0rd! Trainer ID = NGFT001	Trainer account successfully created

ST19	**FIT009**	Create a member account	1) In web browser, enter www.nextgenfitness.com/fitfitt/login 2) On the Log-in window, click the 'Register' link 3) Enter data into required fields 4) Click 'Okay' button to finalize account creation	First name = Justin Last name = Member D.O.B. = 06/24/1975 Address = 34521 Sample Ln. City = Houston State = TX Zip code = 77004 Username = Member001 Password = P@55w0rd! Trainer ID = nil	Member account successfully created
ST20	**FIT009**	Create a manager account	1) In web browser, enter www.nextgenfitness.com/fitfitt/login 2) On the Log-in window, click the 'Register' link 3) Enter data into required fields 4) Click 'Okay' button to finalize account creation	First name = Clint Last name = Manage D.O.B. = 06/24/1975 Address = 26512 Sample ST. City = Houston State = TX Zip code = 77193 Username = Manager001 Password = P@55w0rd! Mgr. ID = NGFM001	Manager account successfully created
ST21	**FIT010**	System is Mac and PC compatible	1) Access system via PC 2) Access system via Mac	Log-in credentials	Successful access to system

GUI Test Case Matrix

Test Case ID	GUI Element	Test Case	Test Steps	Test Data	Expected Results
GT1	**Buttons**	Buttons function as per their code design	Click all buttons	None	Buttons function as designed
GT2	**Drop-down boxes**	Drop-down boxes function as per their code design, Populated with required data, no misspellings	Click all drop-down boxes	Data entered into form	Drop-down boxes function as designed
GT3	**Links**	Links take user to associated content as per their design	Click all links	None	Links function as designed
GT4	**Input forms**	Input forms accept user input	Enter correct and incorrect data into all forms	None	Input forms accept correct data and show error upon incorrect data entry
GT5	**Window Resize**	Window can be resized and content adjusts	Resize Window	None	Content is responsive to window size change and adjusts to fit the window
GT6	**Colors**	All colors fit with UI/UX design plans	Observe color scheme	None	Color scheme complies with design plans

GT7	**Fonts**	Character font adhere to UI/UX design plan	Observe character fonts	None	Character fonts comply with design plan

Security Test Case Matrix

Test Case ID	Requirement ID	Test Case	Test Steps	Test Data	Expected Results
SecT1	**FIT009**	Attempt Log-in to system with incorrect credentials	1) Enter incorrect username 2) Enter incorrect password 3) Click 'Enter' button	User name = BADUSR Password = sUpErHaCk!!009	Log-in failed message
SecT2	**FIT009**	Attempt Log-in to a disabled member account	1) Disable member account 2) Enter username 3) Enter password 4) Click 'Enter' button	User name = Member001 Password = P@55w0rd!	Disabled account message
SecT3	**FIT009**	Attempt Log-in to a disabled client account	1) Disable client account 2) Enter username 3) Enter password 4) Click 'Enter' button	User name = Client001 Password = P@55w0rd!	Disabled account message
SecT4	**FIT009**	Attempt Log-in to a disabled trainer account	1) Disable trainer account 2) Enter username 3) Enter password 4) Click 'Enter' button	User name = Trainer001 Password = P@55w0rd!	Disabled account message
SecT5	**FIT009**	Attempt Log-in to a disabled manager account	1) Disable manager account 2) Enter username 3) Enter password 4) Click 'Enter' button	User name = Manager001 Password = P@55w0rd!	Disabled account message

Stress Test Case Matrix

Test Case ID	Requirement ID	Test Case	Test Steps	Test Data	Expected Results
StrT1	**FIT001**	Simulate 450 to 500 concurrent users of the system	1) Integrate load test tool into network 2) Create 450 to 500 users to Log-in to the system	Generated by load test tool	450 to 500 concurrent IPs active in the system

User Acceptance Test Plan

Documentation: RTM, Test Case Matrix (Guru99, Copyright 2017)

Method: User Acceptance Test

NextGen Fitness management and lead personal training staff shall serve as subject matter experts and participate in acceptance testing (Guru99, Copyright 2017). These tests shall include high-level observation of multiple areas of the software in order to ensure that the product was built to specification and performs as desired (Editorial Board, 2016). Testing shall take place over a span of 30 days within individual fitness clubs. Testing shall be conducted accordance with RTM requirements and test checklists. Once testing results are available, copies of the checklists will be forwarded to QA team leads and project managers for review.

User Acceptance Test Case Matrix

Test Case ID	Requirement ID	Test Case	Test Steps	Test Data	Expected Results
			Server Volume		
UAT1	**FIT001**	Up to 500 concurrent users	1) Software is installed on NextGen Fitness servers 2) Software is opened for use as a "pilot program"	Member, client, trainer, and manager accounts	System will maintain high performance under user load
			Account Creation and Validation		
UAT2	**FIT009**	System accessible only to registered users	1) Delivery of access codes for clients, trainers, and managers 2) User registrations for site access 3) Management audits of client and member accounts to ensure they have the correct access	User created Log-in credentials Access codes for client, trainer, and management users	System allows the registration of user accounts with the appropriate access levels

			Goals Management		
UAT3	**FIT002**	Users can create, edit, and delete up to five fitness goals	1) Users create one to five fitness goals 2) Users edit one to all fitness goals 3) Users delete one to five fitness goals	User created fitness goals	System supports the creation, editing, and deletion of one to five fitness goals
			Activity Management		
UAT4	**FIT003**	Users can add and view fitness activities	1) Users create fitness activities 2) Users view their created activities	User created fitness activities	System supports the adding and viewing of fitness activities
			Nutrition Management		
UAT5	**FIT004, FIT012**	Trainers can upload one to three menu plans; Trainers and clients can view, export, and print one to three menu plans; Managers can view menu plans; Members have no access to menu plans	1) Trainers create and upload one to three menu plans 2) Trainers view, export, and print one to three menu plans 3) Clients view, export, and print one to three menu plans 4) Managers view menu plans 5) Check that member accounts have menu plan access disabled	Trainer created menu plans	Systems supports user upload, export, view, and print of menu plans depending on account access levels

			Vital Stats Management		
UAT6	**FIT005**	Users can edit and view their vital stats	1) Users edit their vital stats 2) Users view their vital stats	Member/ client vital stats	System supports editing and view of member/ client vital stats
			Summary Management		
UAT7	**FIT005**	Users can view, export, and print fitness summaries	1) Users view their fitness summaries 2) Users export their fitness summary to their device 3) Users print their fitness summaries via an installed device printer	Member/ client goals	System supports view, export, and print of user fitness summaries
			Profile Picture Management		
UAT8	**FIT006**	Users can upload, change, and delete their profile picture	1) Members/ clients upload an image 2) Members/ clients change and image to a different image 3) Members/ clients delete the image	Member/ client images	System supports upload, change, and deletion of a profile picture

			Random Quote Generation		
UAT9	**FIT007**	System accesses quote database to display random quotes in its UI element	1) Log-in to an account 2) Observe randomly changing NextGen Fitness UI element	Uploaded quotes to database	System randomly generates quotes in its UI elements
			Random Fitness Picture Generation		
UAT10	**FIT008**	System accesses fitness picture database to display random NextGen Fitness related pictures in its UI element	1) Log-in to an account 2) Observe randomly changing NextGen Fitness UI element	Uploaded pictures to database	System randomly generates pictures in its UI elements
			Mac and PC Support		
UAT11	**FIT10**	System can be accessed by Mac and PC users	1) Users access their accounts via Mac system 2) Users access their account via PC system	User systems	System supports Mac and PC systems

Week 4: Development Strategy

Development Plan Outline

Software development proposals outlining outsourcing, insourcing, and hybrid options will allow the company to analyze areas such as total cost, benefits vs. risks, and quality in order to select the most appropriate strategy for the production of the FitTrac© system. Each area of concern will be analyzed and scored to determine if the entire system or one-to-many of its components are candidates for the proposed options (Niccolls, 2016).

Outsourcing Proposal

I. **Realization** (Niccolls, 2016)
   a. Analysis of the company's previous experience in outsourcing programs
      i. The company currently has little to no experience in outsourcing.

II. **Goal Setting** (Niccolls, 2016)
   a. What will the company hope to accomplish through outsourcing?
      i. Overcome manning and skill constraints associated with developing large scale, enterprise, 3-tier web applications
         1. Requirement ID: FIT011
      ii. Remain under the $800,000 budget cap
         1. Requirement ID: FIT014

iii. Deliver the application to NextGen Fitness before the 18 month deadline.

1. Requirement ID: FIT013

III. Participation (Niccolls, 2016)

a. What areas of expertise will be required to effectively analyze outsourcing as an option?

i. NextGen Fitness Executives

1. Will provide inputs on their long and short term business goals for the application

ii. Company Project Managers

1. Will provide inputs on the company's business strengths and weaknesses in areas such as staffing, scheduling, and compliance issues

iii. Sr. Software Engineers / System Architects

1. Will provide inputs on strengths and weaknesses in the company's development teams, technologies, and application architectural needs

iv. Sales and Marketing Managers

1. Will provide inputs on resource procurement

v. Accounting Managers

1. Will provide inputs on typical estimated costs and budgeting for outsourcing

IV. **Identification of Impact Areas** (Niccolls, 2016)

a. Previous Decisions

   i. Since the company has no previous experience in outsourcing, knowledge of best practices, typical associated costs, policies, and regulatory issues will need to be researched

      1. Estimated time for research

         a. 90 to 180 days

b. Expertise

   i. The company has highly experienced and skilled managers and senior developers, but lacks high skill levels in UI /UX development

      1. Estimated time to fill the skill gap

         a. 90 to 180 days

c. Quality

   i. Due to lack of experience and skill in UI / UX development, the quality of the application could be negatively impacted

d. Costs

   i. Detailed within each outsourcing option

e. Scale

   i. FitTrac© will be a large enterprise application that requires scalability for future growth

   ii. The application requires a separation of concerns that will be addressed through the *MVC* (*Model – View – Controller*) design pattern (Tutorialspoint, Copyright 2017)

f. Security

i. NextGen Fitness end-users require a secure application to protect their personal information

ii. The application's data visualization engines are trade secrets. Protecting code assets is highly desirable.

V. Outsourcing Options

a. Offshoring

i. Captive Center

1. Action

a. Company would open an office in a target country overseas and hire local talent as full-time employees (Editorial Board, 2016)

2. Costs

a. Example - Pitampura, India

i. Compensation (Estimated for 18 months of initial development) : $7,500 * 10 developers = $75,000US (Editorial Board, 2016)

ii. Office costs (Estimated for 18 months of initial development): $13, 553.50US (Oberoi, 2015)

iii. **Total estimated development costs = $88,553.50US**

iv. Ongoing application support and maintenance

1. If captive center were to remain open after application release
    a. Compensation (Estimated for 12 months): $5634 * 10 employees = $56,340US (Editorial Board, 2016)
    b. Office costs (Estimated for 12 months): $9,035.67US (Oberoi, 2015)

v. **Total estimated ongoing costs = $65,375.67US**

3. Benefits
    a. Boosts in production and a decrease in labor expenses by bringing low-cost and well-educated locals onboard (Editorial Board, 2016)
    b. The company would maintain complete control of the application's development and security (Editorial Board, 2016)
    c. Fewer IT, network access, and communications challenges because the center is part of the company (Editorial Board, 2016)
4. Risks
    a. Larger time zone differences could affect communications between captive center employees and the parent company (Editorial Board, 2016)

b. The costs associated with opening a captive center in another country could clash with budget constraints (Editorial Board, 2016)
c. Regulations and compliance policies for opening a captive center in India could be a barrier

ii. Farshoring

1. Action
    a. Company would hire a third-party development team in a target foreign country (Editorial Board, 2016)
2. Costs
    a. Example – India
        i. Compensation (Estimated for 18 months of initial development): $7,500 * 10 developers = $75,000US (Editorial Board, 2016)
        ii. **Total Compensation: $75,000US**
        iii. Ongoing application support and maintenance
            1. If a development team were contracted in India
                a. Compensation ((Estimated for 12 months): $5,634 * 10 employees = $56,340US (Editorial Board, 2016)
            2. **Total estimated ongoing costs = $56,340US**

3. Benefits
    a. This would be the most cost effective offshore solution (Editorial Board, 2016)
4. Risks
    a. Larger time zone differences could affect communications between farshore employees and the company (Editorial Board, 2016)
    b. Attrition of contract employees could compromise the company's competitive edge should they take their knowledge to a competitor (Editorial Board, 2016)

iii. Nearshoring

1. Action
    a. Company would hire a development team in a target neighboring country (Editorial Board, 2016)
2. Costs
    a. Example – Brazil
        i. Compensation (Estimated for 18 months of initial development): $78,750 *10 developers = $787,500US (Clifford, 2015)
        ii. **Total Compensation: $787,500US**
        iii. Ongoing application support and maintenance

1. If a development team were contracted in Brazil
    a. Compensation (Estimated for 12 months): $52,000 * 10 employees = $525,000US (Clifford, 2015)

iv. **Total estimated ongoing costs = $525,000US**

3. Benefits
    a. Reduced production costs (Editorial Board, 2016)
    b. Fewer time zones issues (Editorial Board, 2016)
    c. Lower company travel costs (Editorial Board, 2016)
4. Risks
    a. Attrition of contract employees could compromise the company's competitive edge should they take their knowledge to a competitor (Editorial Board, 2016)

b. Inshoring

i. Action

1. The company would hire a local vendor for development (Editorial Board, 2016)

ii. Costs

1. Example – "Moderate" Class Company (Halyna, 2016)
    a. Project cost range: $15,000 - $50,000
    b. Total Compensation (avg.) = $35,000US
2. Ongoing support and maintenance

a. Cost range: $15,000 - $50,000

b. Total Compensation (avg.) = $35,000US

iii. Benefits

1. Getting highly skilled developers who have gone through background checks (Editorial Board, 2016)
2. No overhead costs from employee benefits (Editorial Board, 2016)

iv. Risks

1. The more senior the development team, the higher their salary costs (Editorial Board, 2016)

VI. Prioritization (Niccolls, 2016)

a. Scoring Metrics

i. Areas will be graded on scale of 1 – 6 (1 – *Highest Priority*, 6 – *Lowest Priority*)

1. Quality
2. Security
3. Cost
4. Expertise
5. Scale
6. Previous Decisions

VII. Final Analysis

a. Because quality, security, and cost are ranked as the projects highest priorities, ***Inshoring*** would provide the potential for the best quality, address security issues through contractual agreements, and keep costs at a moderate level.

Insourcing Proposal

I. **Realization** (Niccolls, 2016)

a. Analysis of the company's previous experience with in-house development

i. The company currently has a great deal of knowledge related to insource development.

II. **Goal Setting** (Niccolls, 2016)

a. What will the company hope to accomplish through insourcing?

i. Maintain high quality levels for the FitTrac system

ii. Maintain data visualization process trade secrets

III. **Participation** (Niccolls, 2016)

a. What areas of expertise will be required to effectively analyze insourcing as an option?

i. NextGen Fitness Executives

1. Will provide inputs on their long and short term business goals for the application

ii. Company Project Managers

1. Will provide inputs on the company's business strengths and weaknesses in areas such as staffing, scheduling, and compliance issues

iii. Sr. Software Engineers / System Architects

1. Will provide inputs on strengths and weaknesses in the company's development teams, technologies, and application architectural needs

iv. Sales and Marketing Managers

1. Will provide inputs on resource procurement

v. Accounting Managers

1. Will provide inputs on typical estimated costs and budgeting for insourcing

IV. Identification of Impact Areas (Niccolls, 2016)

a. Previous Decisions

i. Since the company has previous experience in insourcing, knowledge of best practices, typical associated costs, policies, and regulatory issues are part of the current knowledge information system.

b. Expertise

i. The company has highly experienced and skilled managers and senior developers, but lacks high skill levels in UI /UX development

1. Estimated time to fill the skill gap

a. 90 to 180 days

c. Quality

i. Due to lack of experience and skill in UI / UX development, the quality of the application could be negatively impacted

d. Costs

i. Detailed within insourcing option cost analysis

e. Scale

i. FitTrac© will be a large enterprise application that requires scalability for future growth

ii. The application requires a separation of concerns that will be addressed through the *MVC* (*Model – View – Controller*) design pattern (Tutorialspoint, Copyright 2017)

f. Security

i. NextGen Fitness end-users require a secure application to protect their personal information

ii. The application's data visualization engines are trade secrets. Protecting code assets is highly desirable.

V. Insourcing Analysis

i. Action

1. Company would develop the project in-house (Editorial Board, 2016)
2. Costs
    a. Compensation (Estimated for 18 months of initial development) : $127,500 * 10 developers = $850,000US (Editorial Board, 2016)
    b. Tools: Open-source - $0US
        i. **Total estimated development costs = $1,275,000US**
        ii. Ongoing application support and maintenance

1. If the company were to maintain the application
    a. Compensation (Estimated for 12 months): $85,000 * 10 employees = $850,000US (Editorial Board, 2016)
    b. Total estimated ongoing costs = $850,000US

3. Benefits
    a. Can more easily meet business requirements (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)
    b. Will minimize changes in business procedures and policies (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)
    c. Will meet constraints of existing systems
    d. Will meet constraints of current technology (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)
    e. Will develop new internal resources and capabilities (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)
4. Risks

a. Higher development and maintenance costs (Editorial Board, 2016)
b. Loss of time to acquire the needed employees and/ or technology that may be needed for development and maintenance.

VI. Prioritization (Niccolls, 2016)

a. Scoring Metrics
    i. Areas will be graded on scale of 1 – 6 (1 – *Highest Priority*, 6 – *Lowest Priority*)
        1. Quality
        2. Security
        3. Cost
        4. Expertise
        5. Scale
        6. Previous Decisions

VII. Final Analysis

a. Because quality, security, and cost are ranked as the projects highest priorities, ***Insourcing*** the entire application would not be a cost effective measure. Quality and security for the business and data layers would be maintained.

Combination Proposal

I. **Realization** (Niccolls, 2016)

   a. Analysis of the company's previous experience with a "make part / buy part" development process

      i. The company currently has no experience related to a combination development process.

II. **Goal Setting** (Niccolls, 2016)

   a. What will the company hope to accomplish through combination development?

      i. Maintain high quality levels for the FitTrac system

      ii. Maintain data visualization process trade secrets

      iii. Outsource application components that are cheaper to development and maintain

III. **Participation** (Niccolls, 2016)

   a. What areas of expertise will be required to effectively analyze combination development as an option?

      i. NextGen Fitness Executives

1. Will provide inputs on their long and short term business goals for the application

ii. Company Project Managers

1. Will provide inputs on the company's business strengths and weaknesses in areas such as staffing, scheduling, and compliance issues

iii. Sr. Software Engineers / System Architects

1. Will provide inputs on strengths and weaknesses in the company's development teams, technologies, and application architectural needs

iv. Sales and Marketing Managers

1. Will provide inputs on resource procurement

v. Accounting Managers

1. Will provide inputs on typical estimated costs and budgeting for combination development

IV. Identification of Impact Areas (Niccolls, 2016)

a. Previous Decisions

i. Since the company has no previous experience in combination development, knowledge of best practices, typical associated costs, policies, and regulatory issues would require research

1. Estimated time for research

a. 90 days

b. Expertise

i. The company has highly experienced and skilled managers and senior developers, but lacks high skill levels in UI /UX development

1. Estimated time to fill the skill gap

a. 90 to 180 days

c. Quality

i. Due to lack of experience and skill in UI / UX development, the quality of the application could be negatively impacted

d. Costs

i. Detailed within combination development option cost analysis

e. Scale

i. FitTrac© will be a large enterprise application that requires scalability for future growth

ii. The application requires a separation of concerns that will be addressed through the *MVC* (*Model – View – Controller*) design pattern (Tutorialspoint, Copyright 2017)

f. Security

i. NextGen Fitness end-users require a secure application to protect their personal information

ii. The application's data visualization engines are trade secrets. Protecting code assets is highly desirable.

V. Combination Options

a. Commercial Off-The-Shelf (COTS)

i. Action

1. Company would purchase part of the application from another company (Editorial Board, 2016)
    a. Costs
        i. Best outsourcing option – Inshoring
            1. Example – “Moderate” Class Company (Halyna, 2016)
            2. Project cost range: $15,000 - $50,000
    b. Total Compensation (avg.) = $20,000US
    c. Ongoing support and maintenance
        i. If the outside company were to maintain part of the application
            1. Example – “Moderate” Class Company (Halyna, 2016)
            2. Project cost range: $15,000 - $50,000
            3. **Total Compensation (avg.) = $20,000US**

ii. Action

1. Company would develop the business and data layers in-house
    a. Compensation (Estimated for 18 months of initial development) : $127,500 * 4 developers = $510,000US (Editorial Board, 2016)
    b. Tools: Open-source - $0US
        i. **Total estimated development costs = $510,000US**
        ii. Ongoing application support and maintenance

1. If the company were to maintain the business and data layers
    a. Compensation (Estimated for 12 months): $85,000 * 3 employees = $255,000US (Editorial Board, 2016)
    b. Total estimated ongoing costs = $255,000US

iii. Benefits

1. Lower costs (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)
2. Shorter implementation time (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)
3. Require less technically skilled staff (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)
4. Future updates are provided by the vendor (Crispin, IT425 - Systems Analysis, Design, and Integration (PPT - Phase 3 & 4), 2017)

iv. Risks

1. Limited custom functionality (Editorial Board, 2016)

b. Modified Off-The-Shelf (MOTS)

i. Action

1. Company would purchase part of the application with customized features and consume vendor API(s) (Editorial Board, 2016)

a. Costs
    i. Best outsourcing option – Inshoring
        1. Example – “Moderate” Class Company (Halyna, 2016)
        2. Project cost range: $15,000 - $50,000
    b. Total Compensation (avg.) = $40,000US (customized option)
    c. Ongoing support and maintenance
        i. If the outside company were to maintain part of the application
            1. Example – “Moderate” Class Company (Halyna, 2016)
            2. Project cost range: $15,000 - $50,000
            3. **Total Compensation (avg.) = $40,000US (customized option)**

ii. Action
    1. Company would develop the business and data layers in-house
        a. Compensation (Estimated for 18 months of initial development) : $127,500 * 3 developers = $381,000US (Editorial Board, 2016)
        b. Tools: Open-source - $0US
            i. **Total estimated development costs = $381,000US**
            ii. Ongoing application support and maintenance

1. If the company were to maintain the business and data layers
    a. Compensation (Estimated for 12 months): $85,000 * 3 employees = $255,000US (Editorial Board, 2016)
    b. Total estimated ongoing costs = $255,000US

iii. Benefits

a. Lower costs (Editorial Board, 2016)
b. Require less technically skilled staff (Editorial Board, 2016)
c. Negotiable terms for vendor modifications and bug fixes (Editorial Board, 2016)

iv. Risks

a. Buying company will have to maintain the application unless terms are negotiated (Editorial Board, 2016)
b. Buying company will be at the mercy of the vendor who will control pricing and the update release schedule (Editorial Board, 2016).

VI. Prioritization (Niccolls, 2016)

a. Scoring Metrics

i. Areas will be graded on scale of 1 – 6 (1 – *Highest Priority*, 6 – *Lowest Priority*)

1. Quality
2. Security
3. Cost
4. Expertise
5. Scale
6. Previous Decisions

VII. Final Analysis

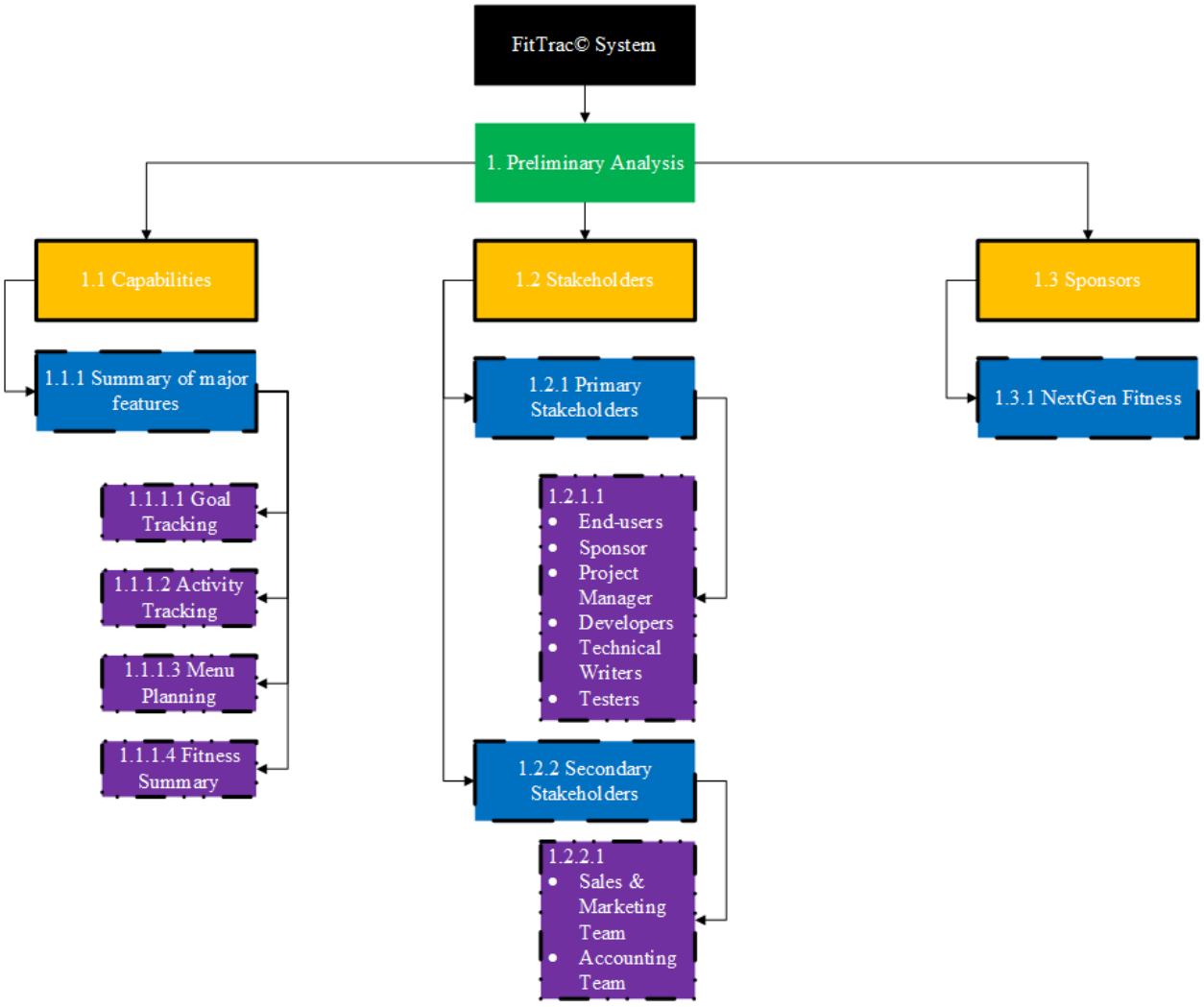
a. Because quality, security, and cost are ranked as the projects highest priorities, ***combination development*** would allow a customized view to be developed by a vendor while the company maintains control of the controller and model layers. Changes within the view will occur less frequently than that of the controller and the model so updates and bugs fixes will not drastically impact application functionality.

Development Strategy Recommendation

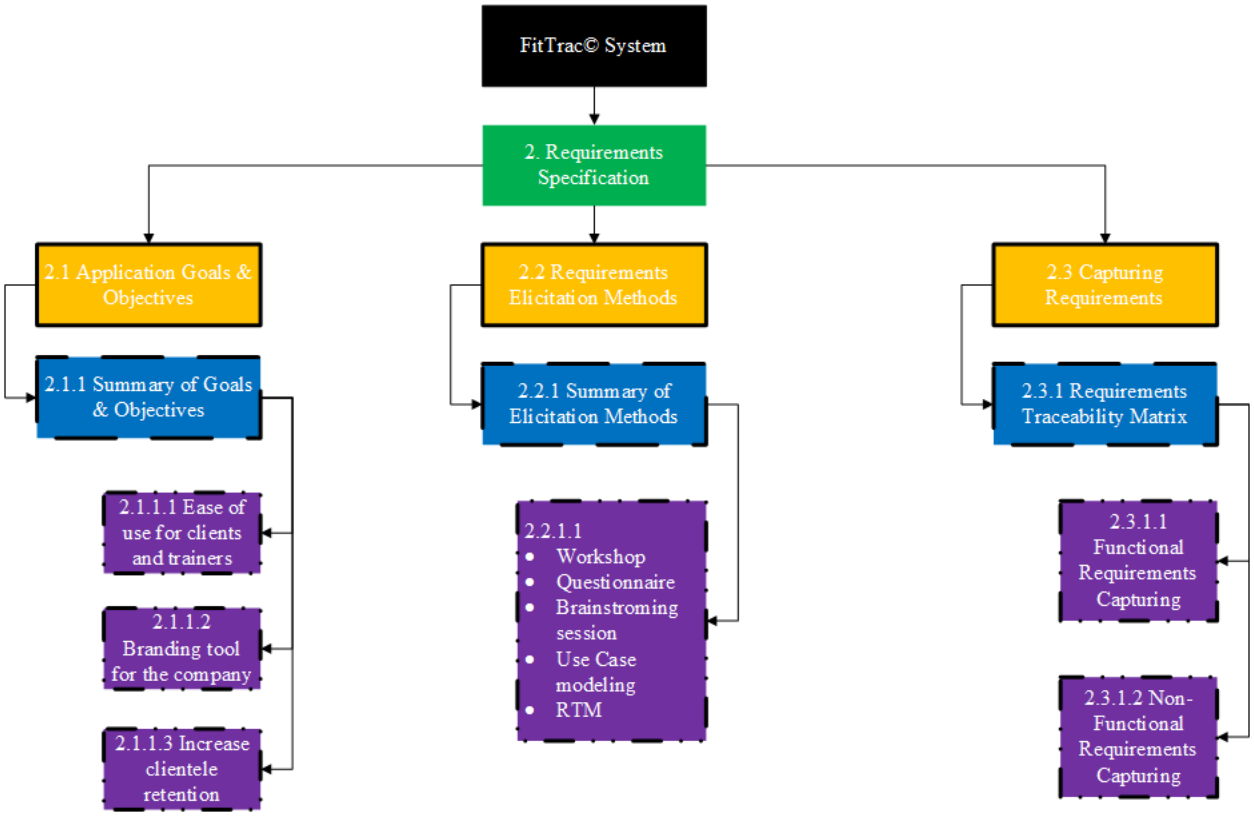
After a complete analysis of the three development strategies, it has been determined that a combination process will meet company and client needs in the short and long term. The hiring of a vendor to perform development of the GUI inshore, although more costly than overseas options, would solve foreign country regulatory, attrition, compensation, and communication issues associated with other processes. Vendor maintenance of the view layer would also solve the skill gap issue that the company is currently facing. Utilizing a local vendor and in-house developers will keep costs well under budget and position the company as the preferred source for future application upgrades and positively impact its reputation. Although updates and bug fixes for the GUI would be driven by the vendor, contractual terms may be created in order to have a predictable schedule and associated billing rate.

Week 5: Integration and Development Plan

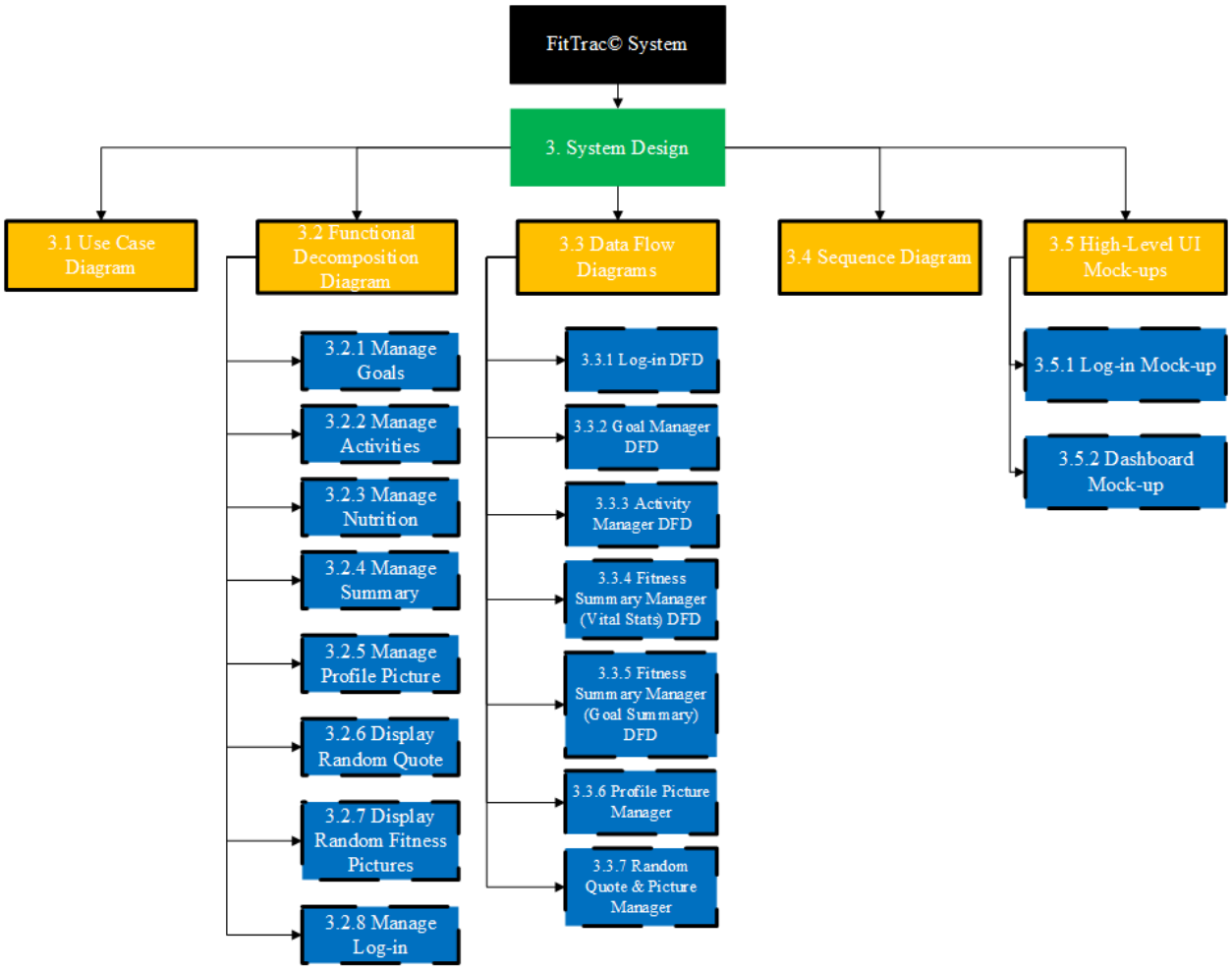
Work Breakdown Structure – Preliminary Analysis



Work Breakdown Structure – Requirements Definition

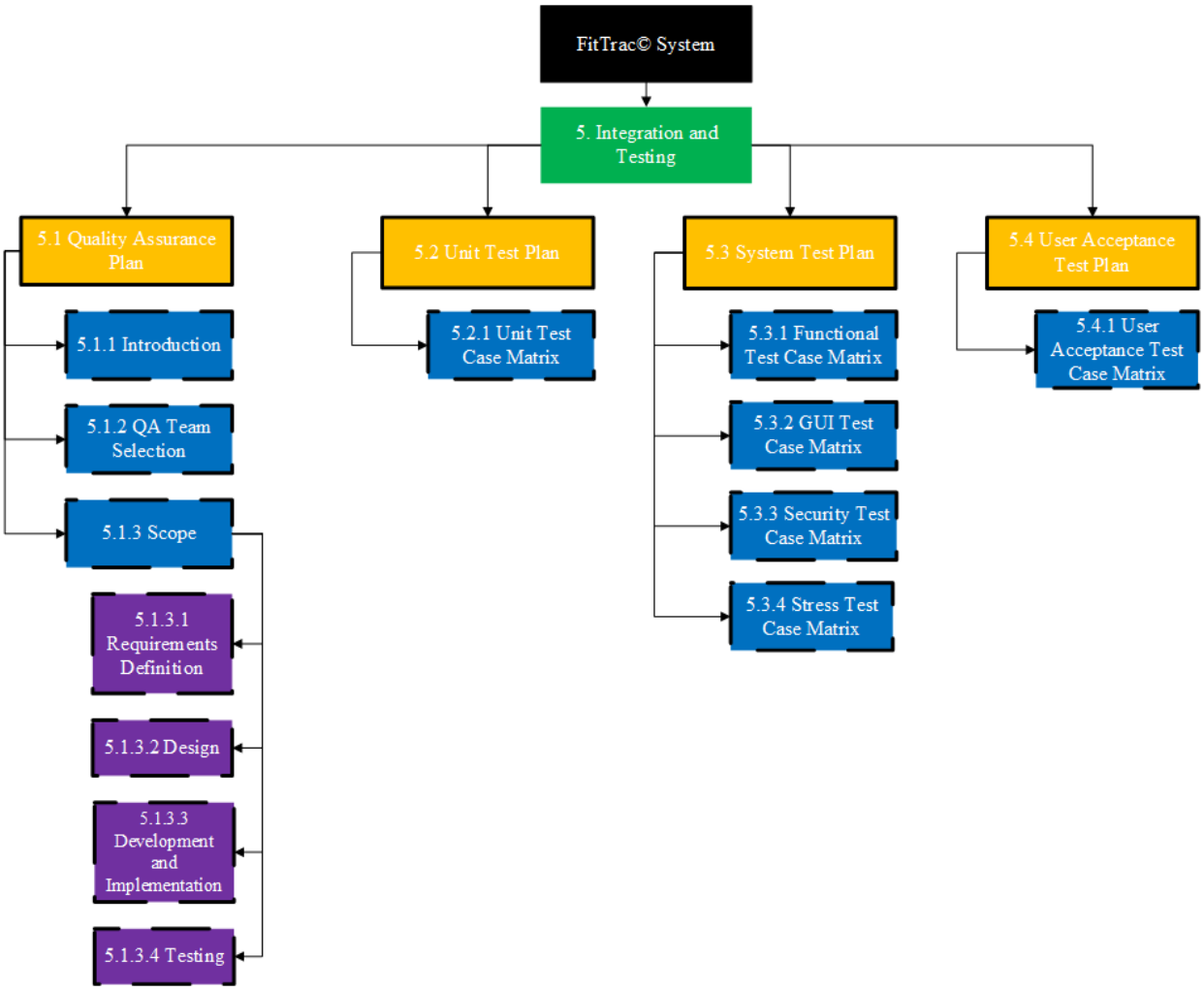


Work Breakdown Structure – System Design

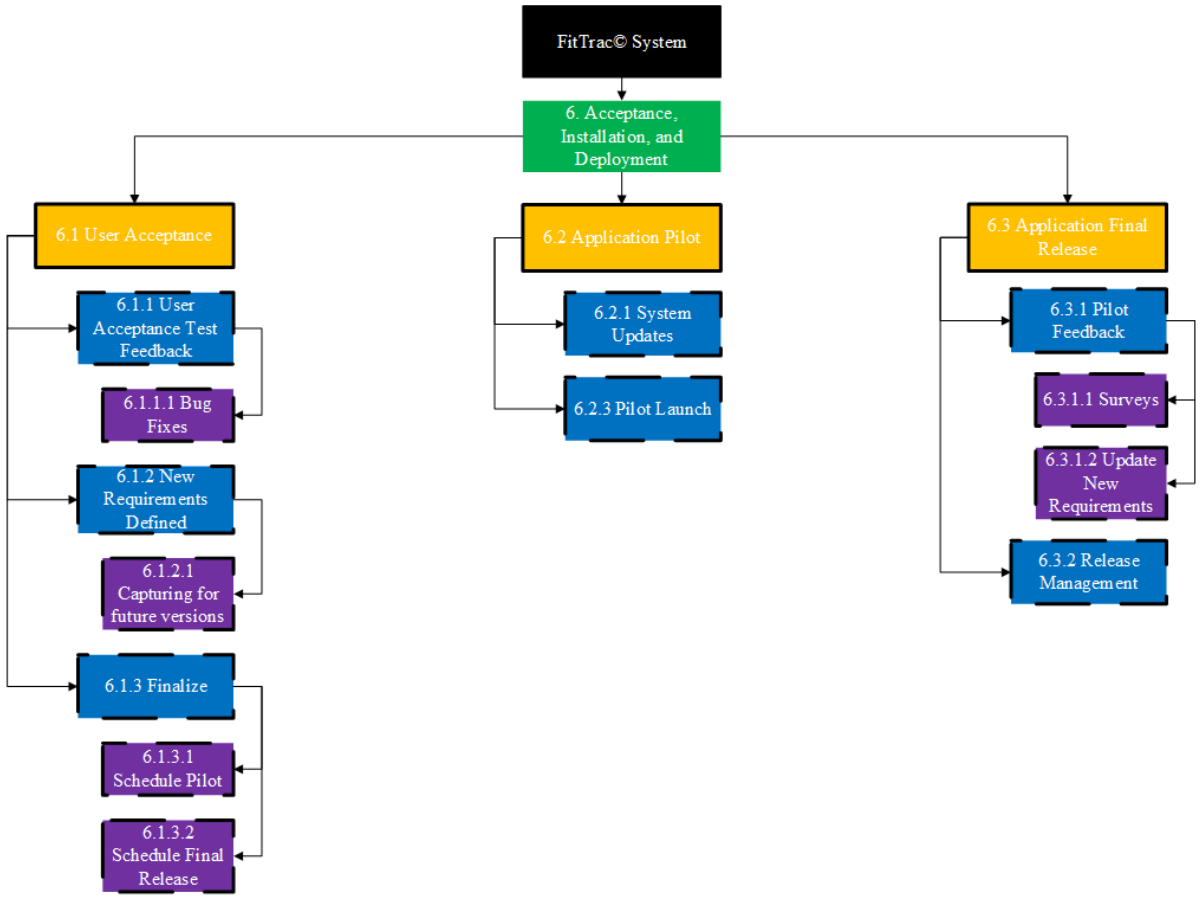


Work Breakdown Structure – Development

Work Breakdown Structure – Integration and Testing

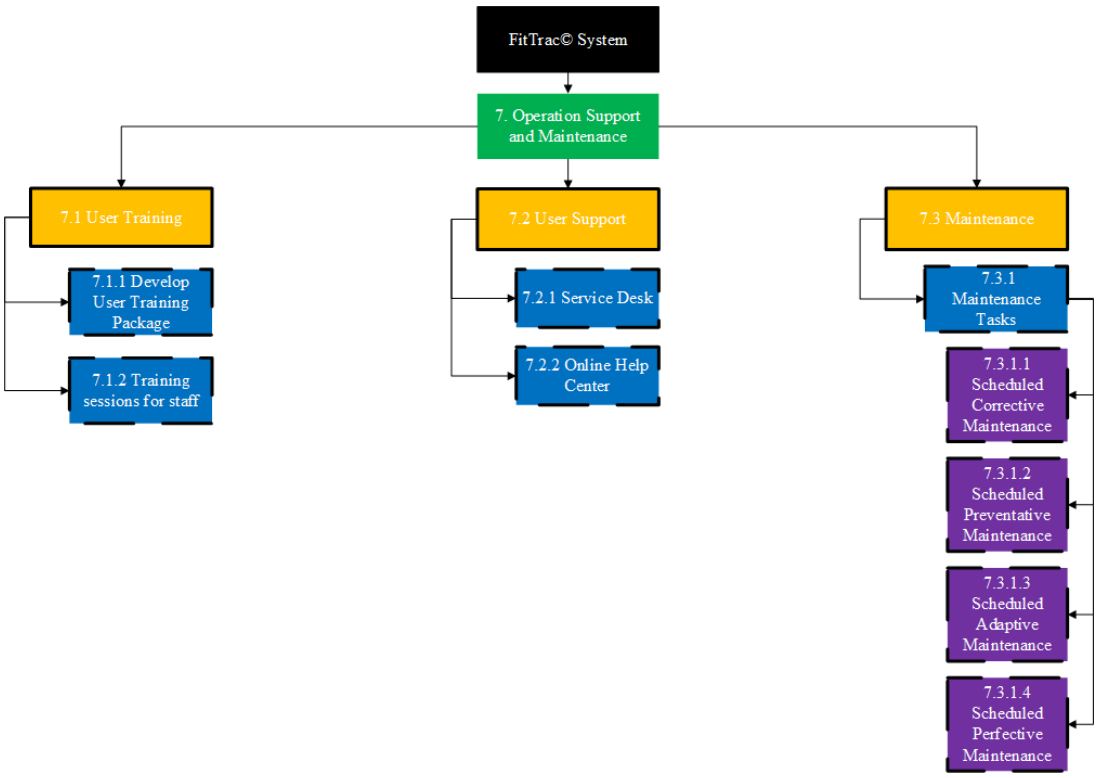


Work Breakdown Structure – Acceptance, Installation, and Deployment



(Crispin, IT425 - System Analysis, Design, and Integration (PPT Phase 5), 2017)

Work Breakdown Structure – Operation Support and Maintenance



(Crispin, IT425 - System Analysis, Design, and Integration (PPT Phase 5), 2017)

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