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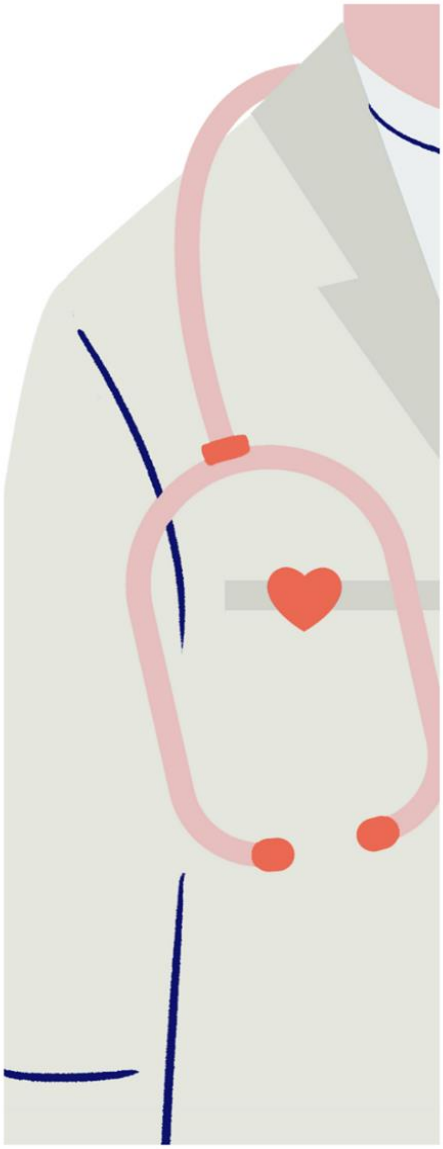

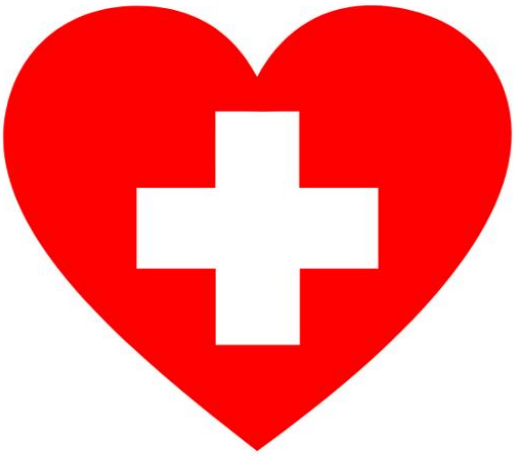

ONLINE DOCTOR APPOINTMENT SYSTEM.

Submitted to

Pratik Bhusal

Module leader

Submitted by

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Project Introduction

The project to be developed is a "Doctor Appointment system" that ensures a user can book an appointment with available doctors from home. This application acts as a bridge between patients and doctor's appointment reducing time required to wait for their turn. Using this application patient can book an appointment with doctor at preferable time and visit in that particular time. In this system, user will be allowed to create their profile from registration page and after successful login; they can search for available Doctors and book the appointment according to their appropriate time. It makes user easier to fix a time for doctor visit. Moreover, this project will also allow maintaining a healthy virtual relationship between doctor and their patient keep record of their medical history and ask for home delivery of a medicine.

Agile Methodology

In Agile methodology of software development, essentials arrangement of methodologies depends on iterative development where requirements for software development and solution for them are developed with a team, focused in arrangement and functional development. It centers on correspondence, criticism and surveys to make a task excellent. Agile methodology normally encourages a trained project management cycle which supports successive assessment and assumption. (Muslihat, 2018)

Agile follows several principles to develop project, which are shown in picture below:

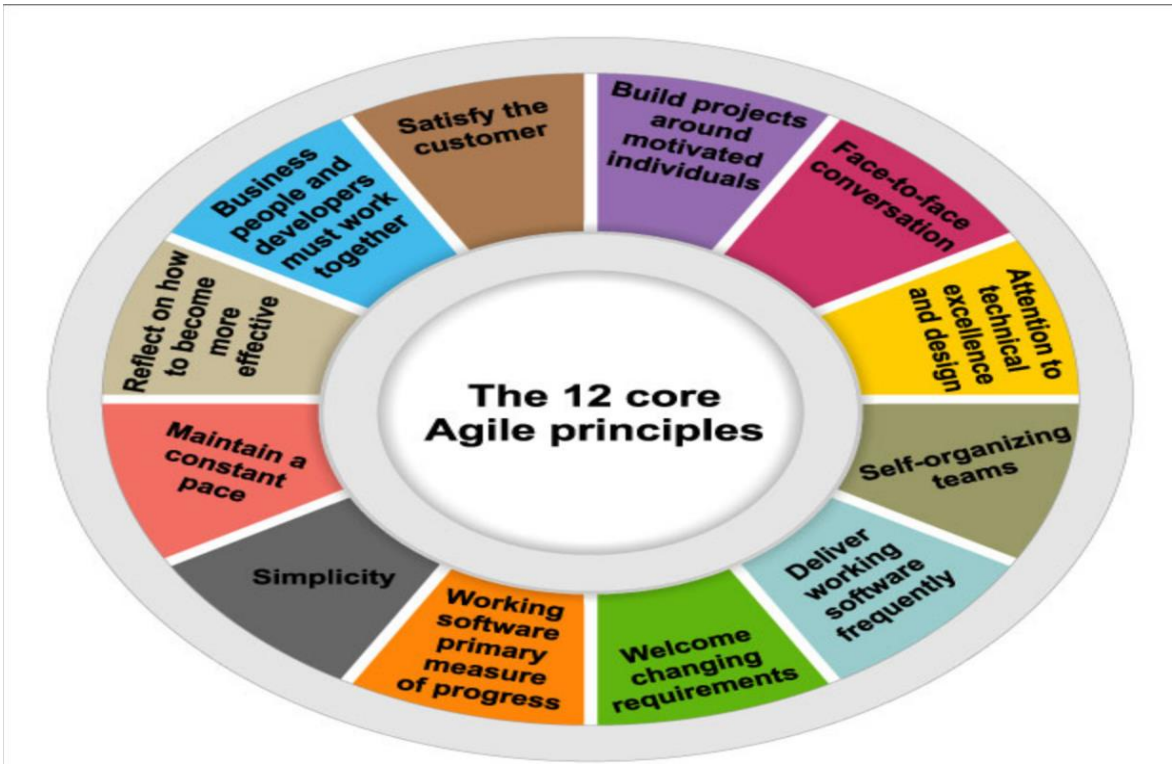


Figure 1Agile Principles

(Anon., 2014)

Scrum

Among different processes and framework that practices agile, this project will be developed in a scrum framework. While building up this undertaking development in scrum framework, following event will happen:

Adopting Methodology

1. Team Member: Based on the size of project, four members were allocated as the scrum team. As a Project owner, I was assigned as a Scrum master so as to develop the requirement of the project. Other team members were Manisha, Sabina, Sumina and Sudarsan as a front-end developer, back-end developer, and Tester respectively. Manisha was selected as a front-end developer, Sumina and Sabina together as a back-end developer and Sudarsan as a tester. Member selected for this role are experienced and have worked together before as one scrum team.

Doctors Appointment Booking System

S.NO	Team members	Roles
1	Deependra Pokhrel	Scrum Master/Project Owner
2	Sumina Maharjan	Development Team
3	Manisha KC	Development Team
4	Sabina Sunuwar	Development Team
5	Sudarsan Udash	Development Team

Figure 2Group

2. Product Backlog and Agile User Story

A Product backlogs for the product build-up for the item has been made by posting all the necessities of the client. The obtained list is organization depending on the client's requirement and prioritizing them accordingly. These lists of requirements are a rough sketch of client's need and can be changed in future. Fifteen requirements have been taken from different user and admin's perspective and prioritized them accordingly with Red, Yellow and Green color. Here color Red is used for high-prioritized user story, color yellow for medium prioritized user story and color green for low prioritized user story.

F.ID	USER STORY	PRIORITY	AS A <type of user>	I WANT TO <perform some task>	SO THAT I CAN <achieve some goal>	FINAL STORY
F1	1	High	USER	Register on the system	get connected with available system.	Done
F2	2	High	USER	Login in a system	Securly access personal account	Done
F3	3	High	ADMIN	Have an Admin Dashboard	Manage the system.	Done
F4	4	High	ADMIN	Add Doctor	Allow User to view available Doctors.	Done
F5	5	High	ADMIN	Delete Doctor	Remove unavailable accounts	Done
F6	6	High	USER	Search for Doctor	Find Doctor Related to my problems	Done
F7	7	High	USER	Book appointment	visit doctor at my available time	Done
F8	8	High	USER	Cancel appointment	cancel my appointment if required.	Done
F9	9	Medium	USER	Pay Online through credit cards	Easily pay and keep record of my payment	Done
F10	10	Medium	USER	Manage personal settings	update personal information	Done
F11	11	Medium	USER	Rate and Review a Doctor	Recommend other users about specific doctors	Done
F12	12	Low	ADMIN	Write News and Articles	Inform user about different healthy habits.	Done
F13	13	Low	ADMIN	Edit News and Articles	Update news and articles	Done
F14	14	Low	ADMIN	Delete News and Articles	Remove news and articles	Done
F15	15	Low	USER	Read Articles and News	Be informed about different health tips and benefits	Done

Figure 3User Story

3. Map board

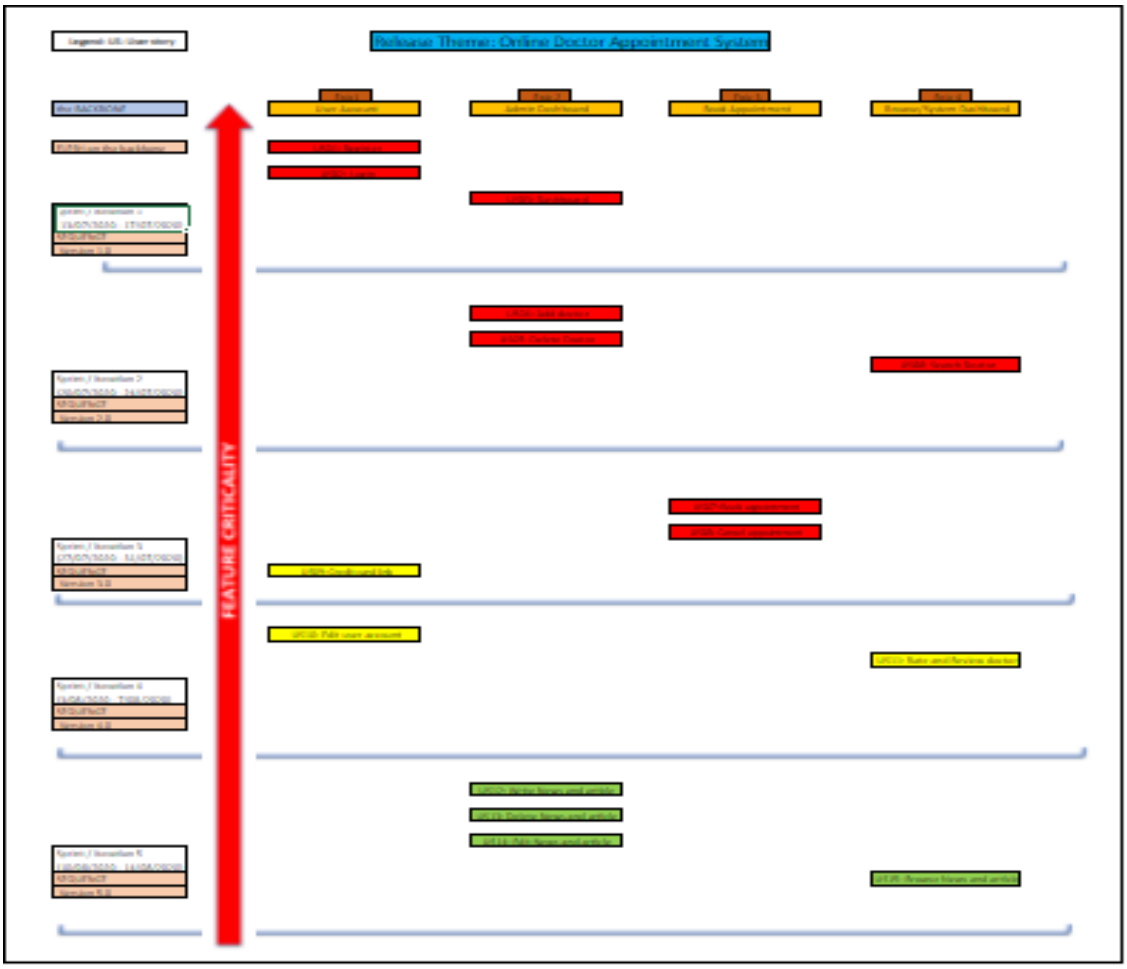


Figure 4Mind map

4. Sprint planning and Agile Release Plan: A duration of 5 day was allocated for one sprint. In a week, 5 day was allocated as a working day and the remaining other day was off. The project is estimated to complete in 5 sprints. Each sprint was estimated of 30 hours of working hour. Moreover, the overall project was estimated to be completed in 150 hours.

Entire scrum team made this assumption while planning the project, user's requirement and their priority list helped in developing time estimation, making it easier and faster for scrum team.

SPRINT	USER STORY ID	FEATURE TYPE	START	FINISH	DURATION(Hour)	STORY POINTS	STATUS	RELEASE DATE
1	US 01	Register	13/07/2020	13/07/2020	6	1	Ongoing	17/07/2020
1	US 02	Login	14/07/2020	14/07/2020	6	1	Ongoing	17/07/2020
1	US 03	Admin Dashboard	15/07/2020	17/07/2020	18	3	Ongoing	17/07/2020
2	US 04	Add doctor	20/07/2020	21/07/2020	12	2	Ongoing	24/07/2020
2	US 05	Delete Doctor	22/07/2020	22/07/2020	6	1	Ongoing	24/07/2020
2	US 06	Search Doctor	23/07/2020	24/07/2020	12	2	Ongoing	24/07/2020
3	US 07	Book appointment	27/07/2020	28/07/2020	12	2	Ongoing	31/07/2020
3	US 08	Cancel appointment	29/07/2020	39/07/2020	6	1	Ongoing	31/07/2020
3	US 09	Pay credit card	30/07/2020	31/07/2020	12	2	Ongoing	31/07/2020
4	US 10	Manage profile	3/8/2020	5/8/2020	18	3	Ongoing	7/8/2020
4	US 11	Rate and review doctors	6/8/2020	7/8/2020	12	2	Ongoing	7/8/2020
5	US 12	Write news and article	10/8/2020	10/8/2020	6	1	Ongoing	14/08/2020
5	US 13	Edit news and article	11/8/2020	11/8/2020	6	1	Ongoing	14/08/2020
5	US 14	Delete news and article	12/8/2020	12/8/2020	6	1	Ongoing	14/08/2020
5	US 15	Read news and article	13/08/2020	14/08/2020	12	2	Ongoing	14/08/2020

Figure 5Agile release plan

5. Sprint Backlog:

Sprint backlog is created in excel sheet by assigning different task to scrum master. Time taken by member of the project is not written here, since it is only the plan of the project and can only been written after development of the project. A rough assumption of how much time will be taken in a sprint is estimated in hours and story point is allocated for the features.

	BACKLOG TASK & ID	STORY POINTS	ASSIGNED TO	STATUS	Estimate (HR)	Day 1	Day 2	Day 3	Day 4	Day 5	SPRINT REVIEW
	#Userstory 1	***1***		**Ongoing**	***6***						
1	Register(Design and Develop UI)		Manisha	Ongoing	3						
1	Develop API		Sabina/Sumina	Ongoing	3						
	#Userstory 2	**1**		**Ongoing**	**6**						
1	Login(Develop Login Page)		Manisha	Ongoing	1						
1	Develop API		Sabina/Sumina	Ongoing	3						
1	Test Login validatation and Credentials		Sudarsan	Ongoing	2						
	#Userstory 3	***3***		**Ongoing**	***18***						
1	Admin Dashboard (Design and Develop User Interface)		Manisha	*Ongoing*	6						
1	Develop API		Sumina/ Sabina	*Ongoing*	12						
	Total	**5**			**30**						

Figure 6Sprint backlog 1

	BACKLOG TASK & ID	STORY POINTS	ASSIGNED TO	STATUS	Estimate (HR)	Day 1	Day 2	Day 3	Day 4	Day 5	SPRINT REVIEW
	#Userstory 4	**2**		***Ongoing***	**12**						
2	Add Doctor (Design and Develop UI)		Manisha	*Ongoing*	5						
2	Develop API		Sudarsan	*Ongoing*	7						
	#Userstory 5	**1**		**Ongoing**	**6**						
2	Delete Doctor (Design and Develop UI)		Manisha	Ongoing	1						
2	Develop API		Sumina/Sabina	Ongoing	3						
2	Testing		Sudarsan	Ongoing	2						
	#Userstory 6	**2**		**Ongoing**	**12**						
2	Search (Design and Develop UI)		Manisha	*Ongoing*	3						
2	Develop API		Sudarsan	*Ongoing*	9						
	Total	**5**			**30**						

Figure 7Sprint backlog 2

	BACKLOG TASK & ID	STORY POINTS	ASSIGNED TO	STATUS	Estimate (HR)	Day 1	Day 2	Day 3	Day 4	Day 5	SPRINT REVIEW
	#Userstory 7	**2**		**Ongoing**	**12**						
2	Book appointment (Design and Develop UI)		Manisha	*Ongoing*	5						
2	Develop API		Sumina/Sabina	*Ongoing*	5						
2	Testing		Sudarsan	*Ongoing*	2						
	#Userstory 8	**1**		**Ongoing**	**6**						
2	Cancel appointment (Design and Develop UI)		Manisha	Ongoing	1						
2	Develop API		Sumina/Sabina	Ongoing	4						
2	Testing		Sudarsan	Ongoing	1						
	#Userstory 9	**2**		**Ongoing**	**12**						
2	Credit card (Design and Develop UI)		Manisha	Ongoing	4						
2	Develop API		Sabina/Sumina	Ongoing	5						
2	Testing		Sudarsan	Ongoing	3						
	Total	**5**			**30**						

Figure 8Sprint backlog 3

	BACKLOG TASK & ID	STORY POINTS	ASSIGNED TO	STATUS	Estimate (HR)	Day 1	Day 2	Day 3	Day 4	Day 5	SPRINT REVIEW
	#Userstory 10	**3**		**Ongoing**	**18**						
4	Manage profile(Front End)		Manisha	Ongoing	5						
4	Call API to edit pages		Sudarsan	Ongoing	6						
4	BDD Script Preperation		Sudarsan	Ongoing	4						
4	Testing		Sabina/Sumina	Ongoing	3						
	#Userstory 11	**2**		**Ongoing**	**12**						
4	(Rate and Review) Design and Develop UI		Manisha	*Ongoing*	5						
4	Develop API		Sabina/Sumina	*Ongoing*	5						
4	Testing		Sudarsan	*Ongoing*	2						
	Total	**5**			**30**						

Figure 9Sprint backlog 4

	BACKLOG TASK & ID	STORY POINTS	ASSIGNED TO	STATUS	Estimate (HR)	Day 1	Day 2	Day 3	Day 4	Day 5	SPRINT REVIEW
	#Userstory 12	**1**		**Ongoing**	**6**						
5	Write news & article (Design and Develop User Interface)		Manisha	*Ongoing*	4						
5	Develop API		Sumina/ Sabina	*Ongoing*	2						
	#Userstory 13	**1**		**Ongoing**	**6**						
5	Edit news & article (Design and Develop User Interface)		Manisha	Ongoing	3						
5	Develop API		Sudarsan	Ongoing	3						
	#Userstory 14	**1**		**Ongoing**	**6**						
5	Delete news and article (Front end)		Sabina	Ongoing	2						
5	Develop API		Sudarsan	Ongoing	2						
5	Testing		Sudarsan	Ongoing	2						
	#Userstory 7 15	***2***		**Ongoing**	***12***						
5	News & Article (Design and Develop UI)		Manisha	*Ongoing*	5						
5	Develop API		Sumina/Sabina	*Ongoing*	7						
	Total	**5**			**30**						

Figure 10Sprint backlog 5

6. Daily Standup: An everyday standoff of around 20 minutes will be held at around 10:00 am, where the scrum team will have a short conversation on their day-by-day finished task, their errand for now as well as any issues they faced during the time. Solution to issues will also be discussed in daily standoffs.

7. Sprint Review: The project is just an arrangement and is not in progress yet. Consequently, no work is performed and no sprint is finished to lead a sprint review. In any case, the arrangement for the sprint review in future is to have a conversation after a sprint fulfillment to see the work that is done in the current run and assess that the product is working. A length of 1 hour is booked for run survey, which has a weeklong run.

8. Sprint retrospective: Since the task is not being developed at this point, review is not performed. However, in future this can be utilized to convey a conversation on what worked in the past sprint and what did not. The positive perspectives can be increased and negative viewpoints can be killed through appropriate arranging in another sprint. A timeframe of 1 hour is given to review at the end of a weeklong sprint.

Task 2:

Introduction:

Agile Manifesto, which spread out a set of qualities and standards for a methodology that endeavors to adjust to changing requirements and client needs, cut waste, and deliver benefits faster utilizing a steady, iterative methodology. Among various agile methodologies, we will be discussing most common Kanban, Extreme Programming and Scrum:

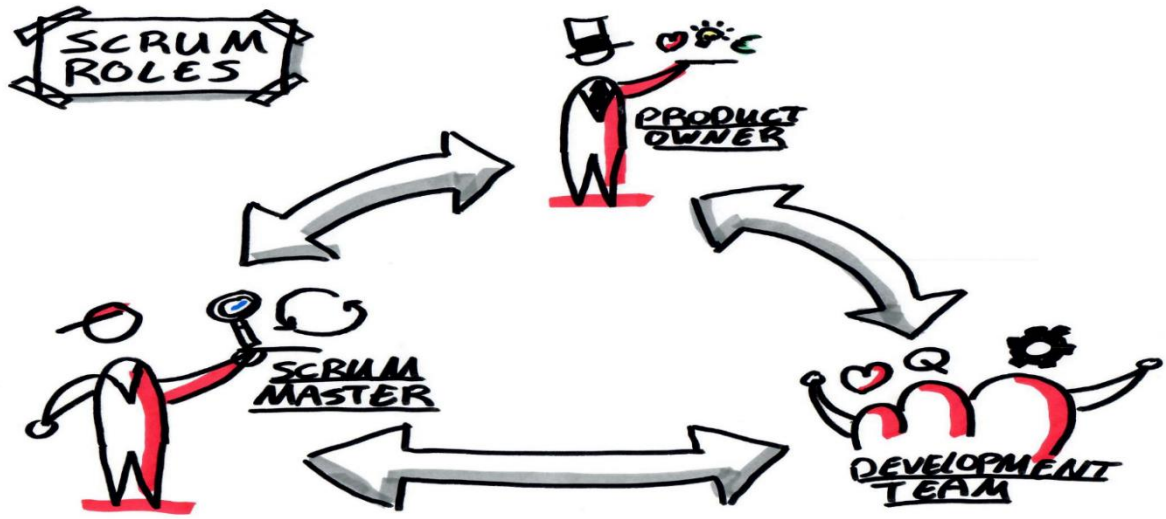
Scrum:

Scrum is a straightforward yet incredibly powerful arrangement of principles and practices that helps team member to deliver products in short cycles, empowering quick feedback, consistent improvement, and fast adaption to change. Scrum expressly endorses a model, as per which team plans for their work, update arrangements and analyze entire work review.

Roles in Scrum

Scrum has three roles:

- Scrum Master: Scrum Master works as a chief of Scrum group. They are the mentor of the group who encourages cooperation, removes hindrances, enforces and shields the Scrum procedure, and protects the group.
- Product Owner: The product owner is 'the single wring-able neck' responsible for delivery of the product. The product owner characterizes the vision of what they need to construct and conveys that vision to the group and the organization.
- Development Team: Scrum team is a group of self-organizing, collaborative group of people commonly comprised between five to seven individuals. Everybody on the project works together, encourage one another, not necessarily bound to distinct roles like designer, developer, or tester. The Scrum team plans how much work they have to finish on each sprint and possesses the plan.



(Alblas, 2019)

Figure 11Scrum role

Events in Scrum:

1. The sprint: A sprint is a heart of Scrum. A sprint is normally 2-3 weeks in span. The team will attempt to start, finish and release work during this time. When a sprint is set, it cannot be changed. If a scrum team is doing 3-week sprints, then the sprint must last exactly 3 weeks.

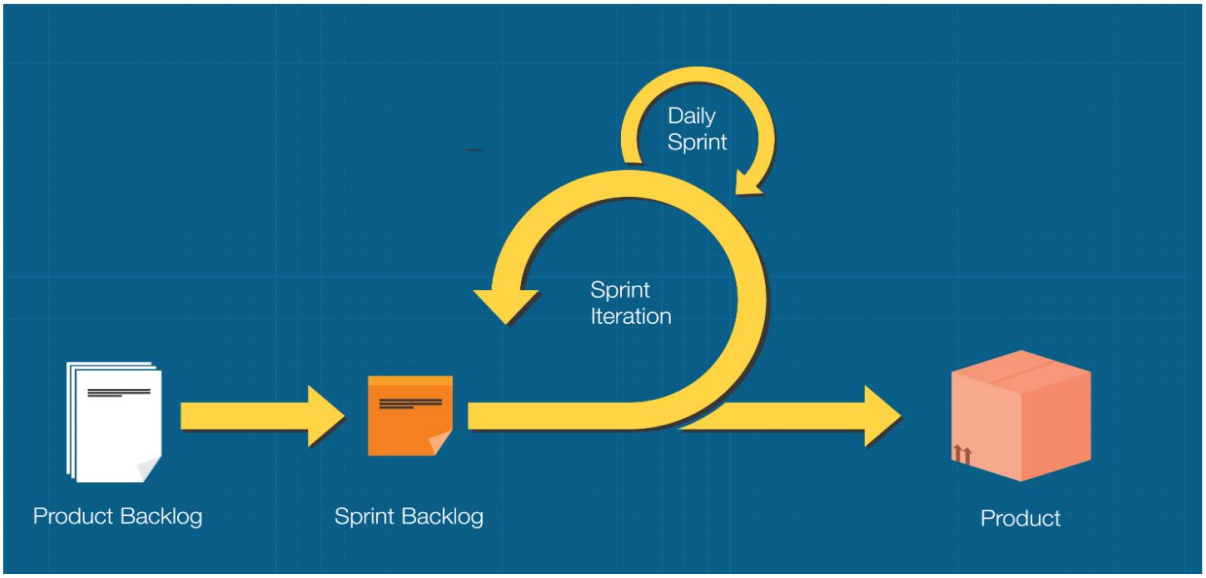


Figure 12Scrum event

(O'Malley, 2020)

2. Sprint planning: In sprint planning, both Product owner and Development team will discuss about product backlog, which will be included in a sprint. The result of sprint planning is to get a sprint goal and backlog that everybody thinks is practical and reachable. Here, Product owner have the privilege while prioritizing every product backlog item in sprint as possible consideration, developers are urged to raise issues, push back and respond if required.

3. Daily stand-up: The daily stand-up is a day by day meeting of close to 15 minutes where every individual from the group gives a brief update (Usually less than a minute) of how their work is progressing.

4. Sprint demo: Hereafter a sprint, SCRUM Master usually sort out sprint demo where the things of the sprint that have quite recently finished can be shown to key stakeholders.

5. Sprint retrospective: SCRUM teams will hold a review meeting at the end of each sprint with the goal that all team members can give contribution on what is working well and what is not working well. With well-run teams, it should not require more than 30 minutes for sprint retrospective.

Kanban

The framework of Kanban methodology of development was introduced by Taiichi Ohno, a Toyota company engineer. Ideology of Kanban methodology describes about refrain from producing a surplus. It accomplishes by utilizing Kanban cards and Kanban board, imagining assets travel format along production cycle. This gives everybody included greatest perception in the cycle and assists manager with tending to overflow/deficiency continuously. Nothing is developed except if it is financially beneficial to customer in Kanban.

Kanban Roles

In Kanban methodology, a specified role for its development teams is not predetermined. However, two job is emerging in Kanban Methodology to control the progression of project development in an effective manner. The roles are:

- Service Delivery Manager (SDM): Responsible for work delivery to customer.
- Service Request Manager (SRM): Responsible for relation management with customer. (Anderson, 2016)

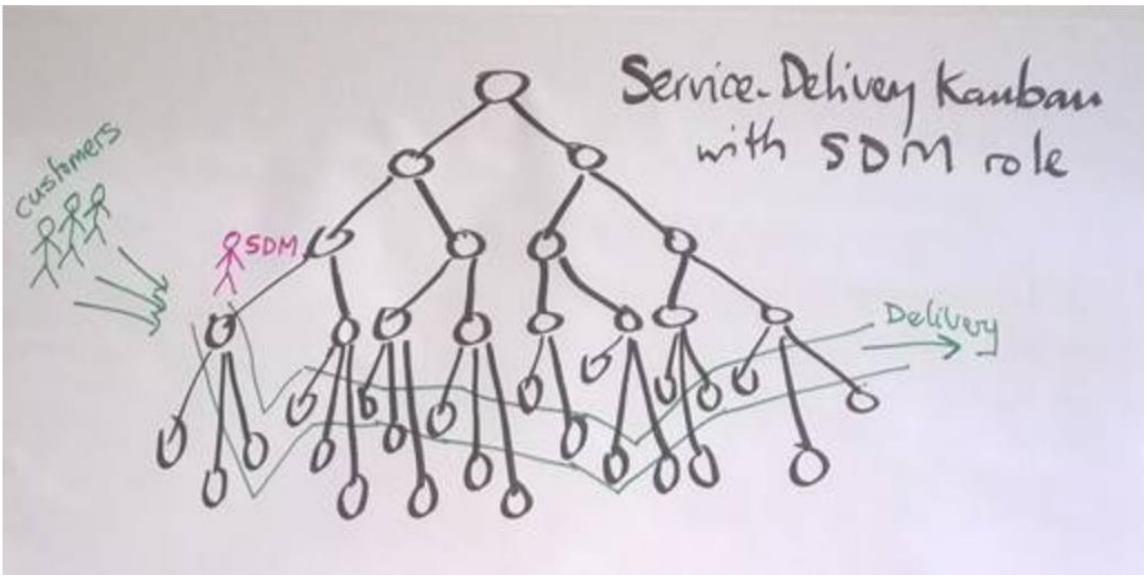


Figure 13Role of Kanban (SDM)

Events in Kanban

In Kanban, team work together to maintain a healthy environment and manage continuous delivery of a working software. Other events done in Kanban are furthered explained below:

1. Visualize the flow of work: It is the essential starting step to receiving and executing the Kanban Method of software development. Kanban should be visualized on a tangible or an electronic Kanban board, procedure sequence member uses to at the moment need to convey their performance or their resources. Depending upon the complexity nature of procedure can be extremely easy to elaborate.

Figure 14Kanban board

(Anon., n.d.)

2. Limit WIP (Workflow in Progress): Right when team develop cutoff area to the proportion of work they have in progress in a framework and utilize those cutoffs are to guide when to start new things, they can smooth out the progression of work and decrease lead times, improve quality, and pass on as often as possible.
9. Manages Flow: The progression of work in a service should grow esteem distribution, limit guide time, and be as predictable one could reasonably be expected. Group use definite control through straightforwardness, assessment and adaption in order to change these possibly conflicting objectives.
10. Process policies Explicit: Express technique assists with explaining a cycle past essentially the listing of different stages in the work cycle.
11. Implement Feedback Loops: Criticism circles are basic part in any system planning to give formative change. The Feedback circle utilized in Kanban are depicted in Life-cycle portion.
12. Improves collaboratively, Evolve Experimentally (using scientific method): This methodology begins with the process as it currently exists and applies continuous and incremental improvement opposed to attempting to reach at a predefined completed goal.

Extreme Programming (XP):

XP began as a path by Kent Beck, Chrysler (Car Company) at that point. The thought was to take sifted through programming practices to the preposterous (Extreme) and see what occurs. For instance, rather than code audits, doing combine programming, actually assessing code constant. Afterward, as more organizations began receiving this methodology, certain unbendable principles began to be excluded -, for example, day-by-day reconciliation tests.

Extreme Programming Roles

Although Extreme programming determines specific practices of a team member to follow, it does not generally set up explicit role for the individual in a team. Some of the extreme programming roles can be combined, but some clearly cannot. The Extreme Programming Roles are:

- Tracker
- Customer
- Coach
- Tester
- Developers

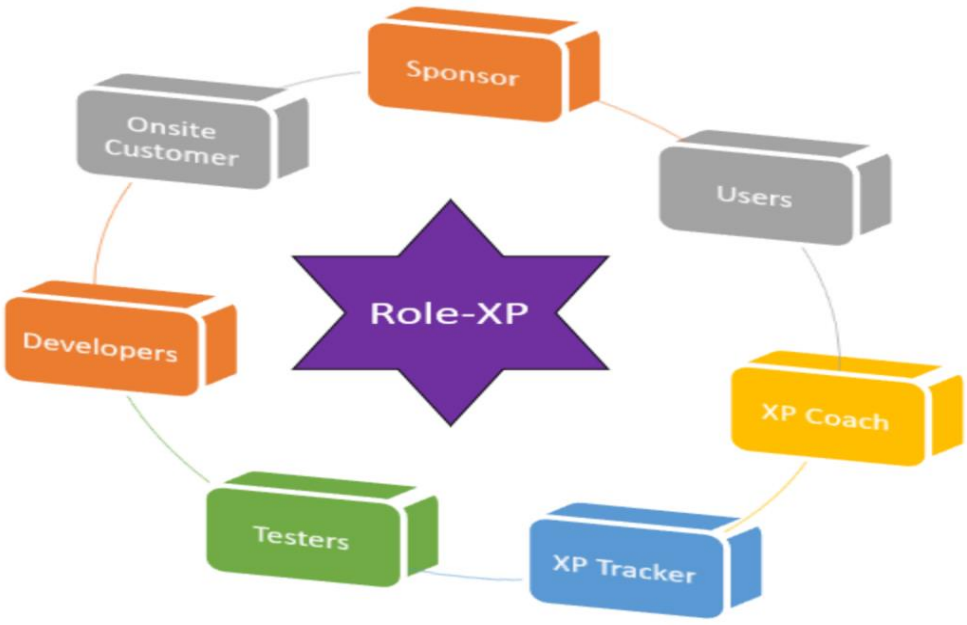


Figure 15XP Role

(Mistry, 2019)

Events of Extreme Programming

While four basic work like planning, design development and testing takes places in extreme programming. Kent beck suggested 12 practices that would define the principles of Extreme Programming, which are divided in four different groups.

Figure 16XP Events

(Anon., 2018)

1. Feedback

a. Test-driven Development: This methodology says every bit of code must travel through test to be delivered. So, programmers along these lines center around developing code ready to achieve the required capacity, which get immediate reviews and feedback from developer.

b. The Planning game: At the beginning of each cycle, the team alongside the client leads a conversation on endorsing an item's feature. The developers allot tasks for every one of them by the examined cycle and release.

c. On-site Customer: The client is available at all time to help the team in their task. They are available as a part of a team.

d. Pair Programming: Duo developers cooperate while working on a similar code. If one composes code, the other one is there to audit and fixed any occurred mistakes of the code.

2. Continual Process

a. Continuous Integration: Development groups take iterative advancement to another level since they submit code on different times, which is a persistent combination. Developers communicate what part of code can be re-utilized or shared. Professionals identifies the significance of communication. This manages, exactly what functionality should be developed.

b. Code Refactoring: Conveying business principle with well-planed system instantly, developer group uses refactor. Objective of refactoring method is consistently enhance code while developing system.

c. Small Releases: XP member convey the primary version of the product in a very fast way, which helps in bugs and error finding and fixes. The client will be completely aware of how the product will be after delivery.

3. Understanding of Code.

a. Simple Design: The premier structure of development is the easy one that runs effectively. In the event that finds problem, it must be evacuated. Perfect plan has to travel through all test, have zero redundancy, and should have least feasible classes and object.

b. System Metaphor: System illustration represents a basic plan that has many specific characteristics. A plan and its structure must be reasonable to people and they ought to have the option to begin chipping away at it without investing an excessive amount of energy contributing determinations.

c. Collective Code Ownership: Training broadcasts a whole group's obligation regarding the structure of a framework. Each colleague can audit and update code. The training keeps up to stay away from code duplication.

d. Coding Standards: XP team has an act of composing codes in a typical manner by maintaining similar style and configuration. This permits the entire team to clearly understand every code and utilize if required.

4. Work Condition

a. 40-Hour a Week: XP ventures anticipate that designers should work quickly, be proficient, and support the quality. Keeping the work-life balance keeps experts from burnout. One extra time seven days is conceivable just if there will be none the week after in XP.

Advantages of Scrum, Kanban and Extreme Programming (XP)

Scrum Advantages

- Consumer satisfaction with conveyance of excellent programming.
- It keeps up a high level of team correspondence.
- Scrum can assist team with finishing project expectations rapidly and efficiently.
- Scrum assurance successful use of money, time and energy.
- Short sprints empower changes based on feedback a lot more easily.
- It has short startup time and quicker delivery of first solution.
- Functions praiseworthy while moving fast in development projects.

(Chandana, 2019)

Kanban Advantages

- Provides a good basic overview of where tasks are on a timeline.
- Kanban methodology expands the process flexibility.
- Increased delivery output because of shortened cycle times.
- Provides decent collaborative space to have different people remarking on multiple tasks. (Carpenter, 2019)

Extreme Programming (XP) Advantages

- Expands the process of flexibility and adoption of change.
- Development process at faster rate due to regular testing.
- Availability of constant feedback and place for adoption of changes
- Maintains code simplicity since programmers are inspired to make simple code as possible
- Less costly and time consuming.

Disadvantages of Scrum, Kanban and Extreme Programming (XP)

Scrum Disadvantages.

- Significant level of organization transformation is required to make scrum projects successful
- Significant amount of training and skills is required to implement successfully.
- Not considered suitable for plan-driven development.
- Scaling scrum to huge project and complex projects is difficult.

(Cobb, 2019)

Kanban Disadvantages

- Obsolete Kanban board prompt concern while system development is in process.
- Team member of Kanban sometimes makes the board over-complicate.
- Absence of timing is another burden because there are no times related with each stage.
- Timing is also one of the inconveniences on the grounds, where no time spans concerned in every stage.
  (Team, 2016)

XP (Extreme Programming) Disadvantages

- Defect documentation is not always good in XP.
- XP does not measure code quality assurance.
- XP might not be best if developers are separated geographically.
- XP might cause defects in initial code.
- XP centers on code as opposed to plan, which may be issue in software design.
  (Kukhnavets, 2018)

Comparative Study of different methodologies in agile.

An umbrella framework that applies Agile set of qualities and standards for all type of habit-oriented, the famous among which Scrum, Kanban and Extreme Programming (XP) are comparatively analyses below:

Factor	Scrum	Kanban	XP (Extreme Programming
Key Roles	Product Owner Scrum Team Scrum Master	Not usually specified but for some case: SRM (Service Request Manager) SDM (Service Delivery Manager)	Customer/Client Project Developer Project Coach Tester Tracker
Release Time length	2-4 Weeks	N/A	Can be up to 6 weeks long.
Communication Method	Stands-ups, Documentation and Meeting (Daily)	Meeting held by product director, stand-ups.	Stands-ups, Documentation and Meeting (Daily)
Product Size	Huge (Large Scale)	Standard software (Software to be developed in short period.)	Small (Small sized project)
Release Method	Various Release	Constantly delivery	Various Repetitive releases
End user involvement	No involvement (Product owner is end user)	During the time of delivery.	User/clients tests Software in every span.

(Hossain, 2013)

Conclusion:

Methodology under Agile framework mentioned above holds the ability to changeable environment of the market in their own particular manner. However, for the development of "Doctors Appointment System" scrum-methodology is used. The working idea of scrum is straightforward and is reasonable for project of this size. Scrum methodology can set a quick startup time promising product in first solution and process of communicate strategies like standoffs, audits and review will expand the coordination of the team to perform better and result in a successful product.

Thus, after analysis the different aspects of agile frameworks and procedures that undertake agile principle, Doctors appointment system will be developed by the scrum methodology. The scrum team of the project to develop a high-quality product will properly carry out the principle, roles and events of scrum.

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