Application Development
SCSJ 3104

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Application Development

Application Development is a comprehensive service learning course which requires student to solve a real community problem by developing an application

What is Service-Learning?

Service-learning is a structured learning experience that combines community service with explicit learning objectives, preparation, and reflection.

What is Service-Learning?

Students involved in service-learning are expected to :

Choose a specific community problem to be solved

Visit the community to get requirement

Design the solution and develop Application

Verify the Application

Course Evaluation

This course evaluates student in :

Proposal and Project Planning

Deliverable

Project Report

Log and Peer Assessment

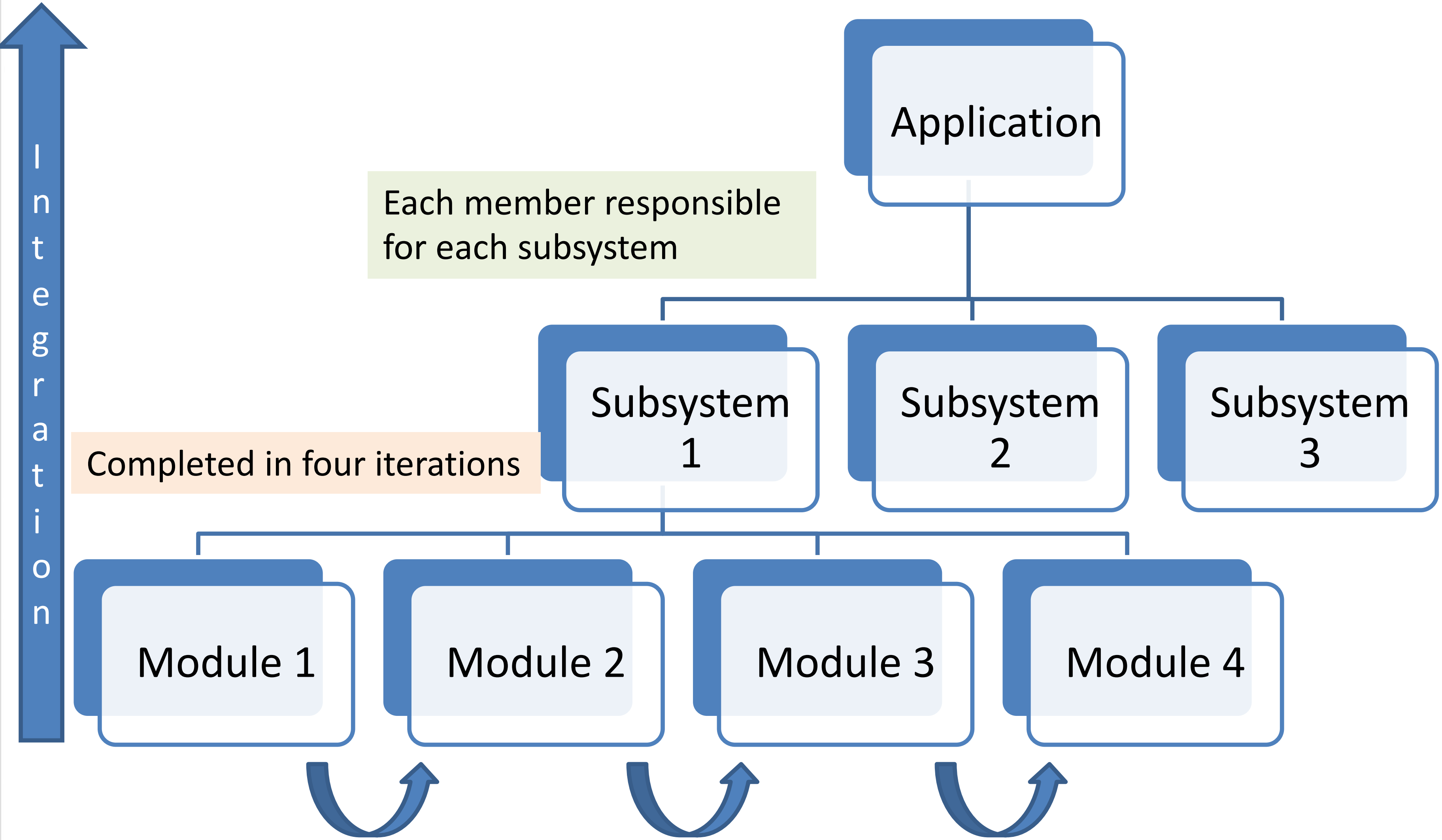
Application

Presentation and Product Showcase

Group Work

- Three students per group
- Modular concept - each project has at least three subsystems where each student responsible for their own subsystem
- Each member will go through their own specific requirement until integration and has their own Log Book

Application Structure



Integration

Application

Each member responsible for each subsystem

Subsystem 1

Subsystem 2

Subsystem 3

Completed in four iterations

Module 1

Module 2

Module 3

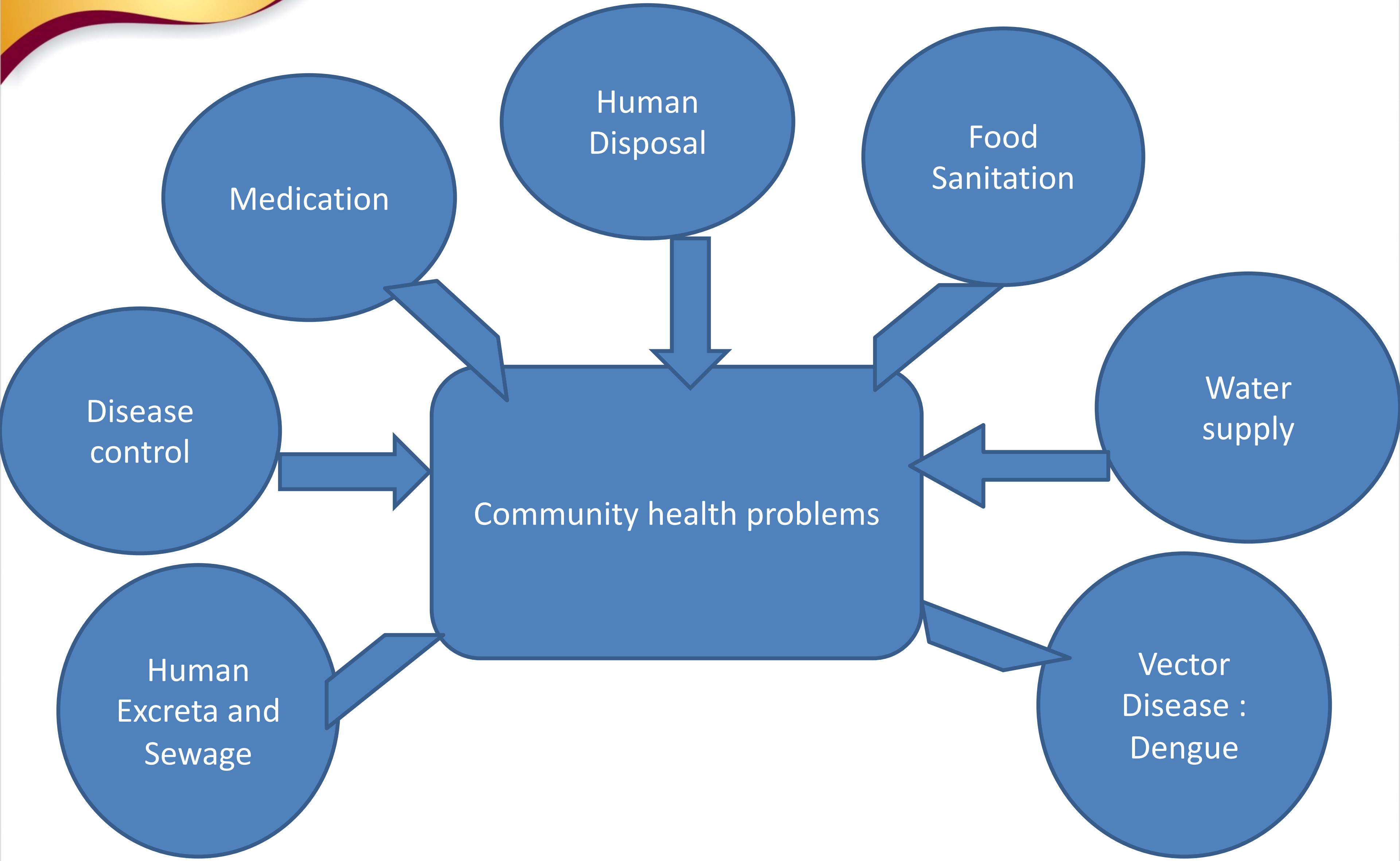
Module 4

- Student are not allowed to
  - do project based on assumption or copy the existing project. The project will always come with proof of works (picture, interview etc. with the community)
  - do the same task all the ways (for example writing documentation only, or to do programming only etc.)

Sample Application

The Community Health

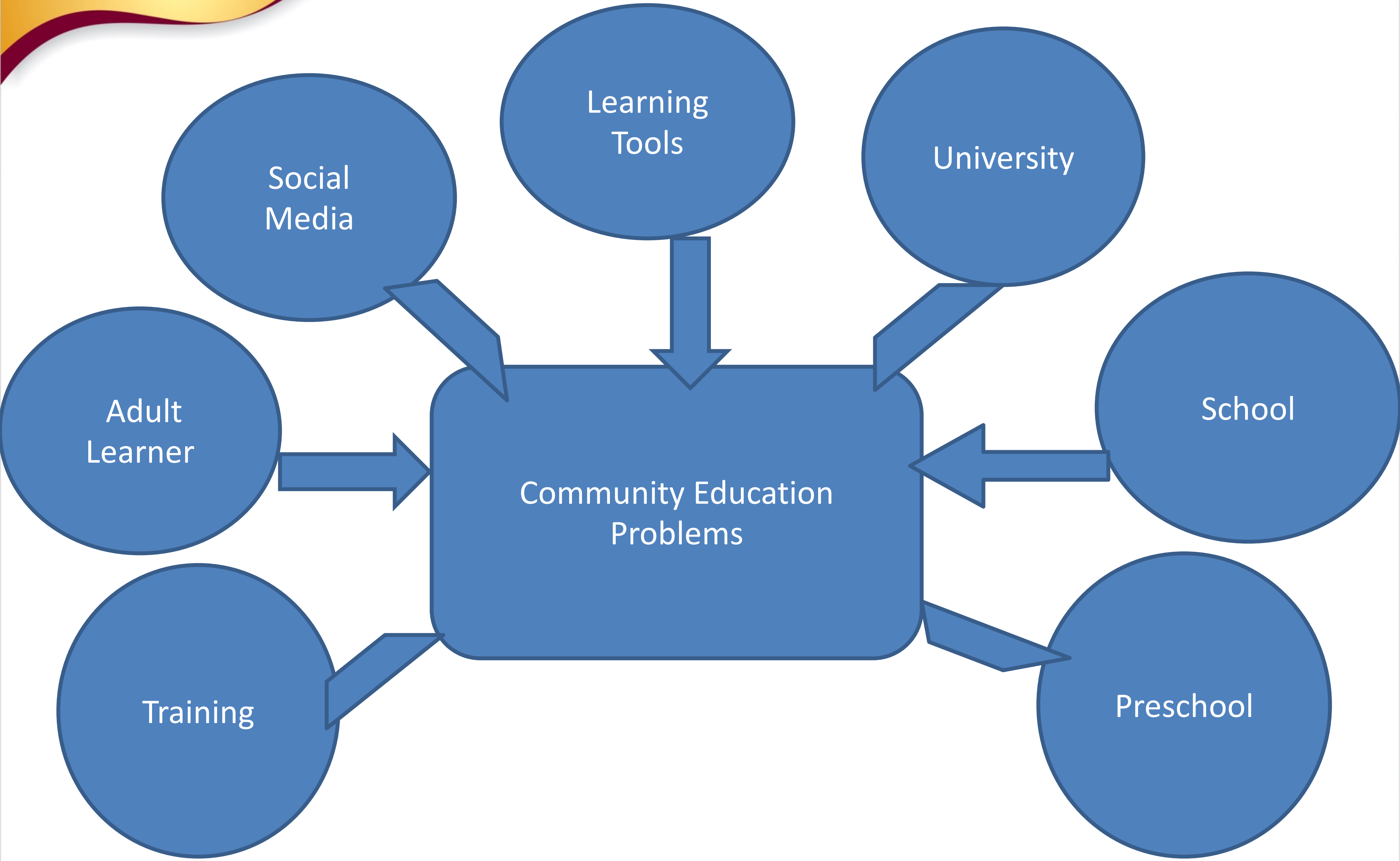
Community health > is the art and science of maintaining, protecting and improving the health of all the members of the community through organized and sustained community efforts.


Medication
Human Disposal
Food Sanitation
Disease control
Community health problems
Water supply
Human Excreta and Sewage
Vector Disease : Dengue

Sample Application

The Community Education

Community education > is an organization's programs to promote **learning** and social development work with individuals and groups in their **communities** using a range of formal and informal methods.



Social Media

Learning Tools

University

Adult Learner

School

Community Education Problems

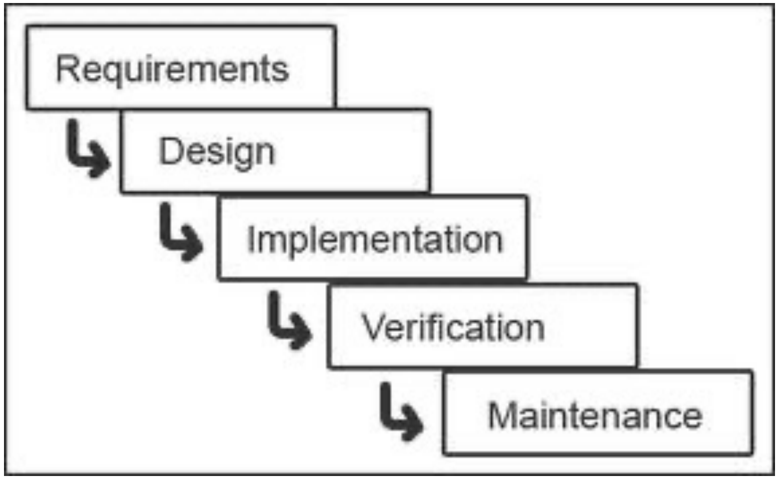
Training

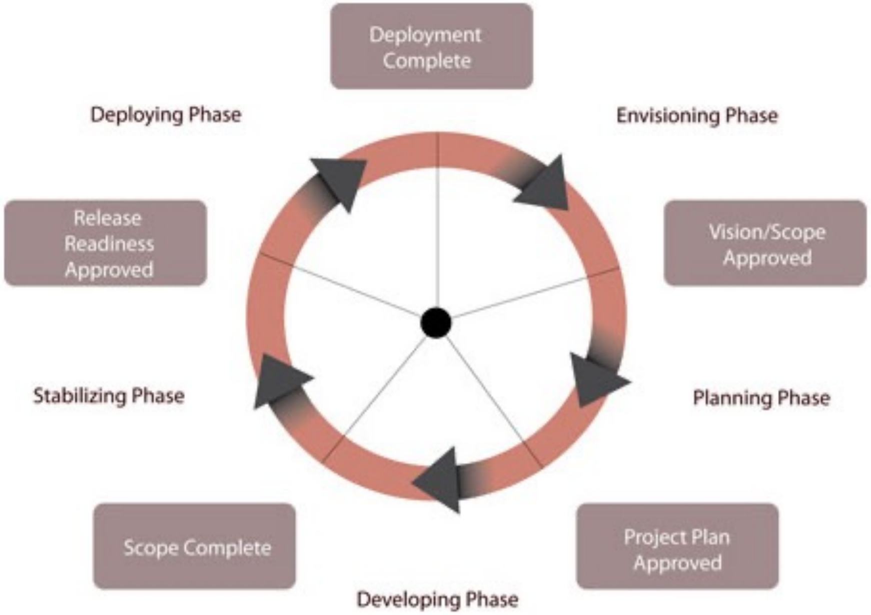
Preschool

Software Development Process

Two broad schools of thought in software development

- Traditional sequential, “the waterfall”
- Iterative methods
  - Agile methods





Current Problem in SW development

23% of projects are canceled
before they ever get completed … 52.7% of projects will
cost 189% of their original estimates.

Plus project complexity is increasing

- – Demand for quicker delivery of useful systems
- – Increasingly vague, unpredictable requirements

Are conventional development/management practices addressing the problem?

Project cancelled

Size of project	Early	On-Time	Delayed	Cancelled	
1 function point	14.68%	83.16%	1.92%	**0.25%**	
10 function points	11.08%	81.25%	5.67%	**2.00%**	
100 function points	6.06%	74.77%	11.83%	**7.33%**	
1,000 function points	1.24%	60.76%	17.67%	**20.33%**	
10,000 function points	0.14%	28.00%	23.83%	**48.00%**	
100,000 function points	0.00%	13.67%	21.33%	**65.00%**	
Average	5.53%	56.94%	13.71%	**23.82%**	

Table 1: Percentage of projects early, on-time, late, canceled
(from *Patterns of Software Systems Failure and Success,* by Capers Jones)

Agile Manifesto

- Developed by 17 of the leaders in agile methodologies in Feb 2001.

  "We are uncovering better ways of developing software by doing it and helping others do it. Through this work we have come to value

  - ***Individuals and interactions*** over processes and tools
  - ***Working software*** over comprehensive documentation
  - ***Customer collaboration*** over contract negotiation
  - ***Responding to change*** over following a plan

  That is, while there is value on the items on the right, we value the items on the left more."

Agile Terminology

- Agility
  - Agile software development is a style of software development characterized by an emphasis on people, communication, working software, and responding to change.

- All Agile methodologies engage in an iterative workflow and incremental delivery of working software in short time-boxed iterations.

- In this course we limit the iteration to FOUR ITERATIONS consisting of FOUR MODULES

Concerns of Agile Software Development

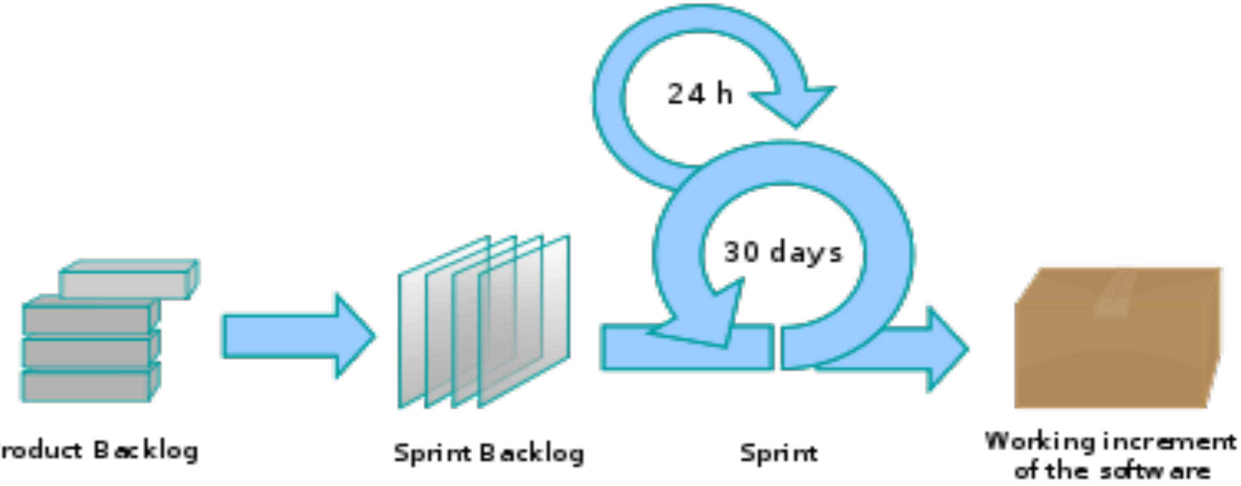
- Adaptive to requirements change
  - 60%~65% requirements change during the project
- Quick development,… Less wait
- Team Collaboration – less documentation

SCRUM Focuses on

- **Documents**:
  - Backlogs, Sprints, Burndown charts
- **Activities**:
  - Daily meetings, planning, reviews
- **Roles**:
  - Product owner, Scrum master, Team (customer, developer, tester)

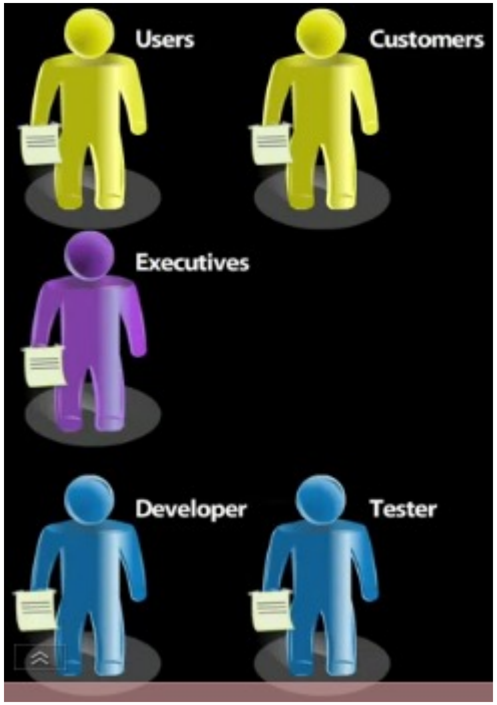
SCRUM Framework

- Product backlogs
- Release backlogs
  - Sprints
- Burn-down charts
- Team roles



Software Development

- Developing Software product
  - Requirements gathering for features from different stakeholders
    - List of features requests – wish list



Product Backlogs

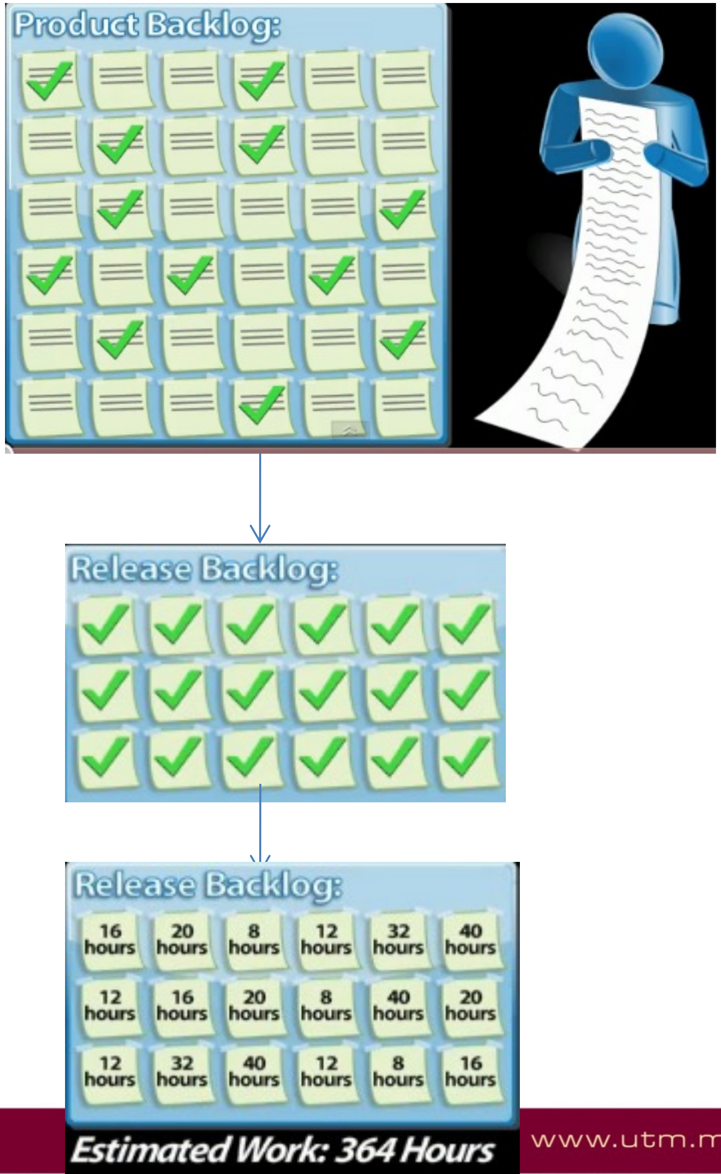
- Collection of all these features, functionalities is called product backlog.
- This is a wish list that makes the software great.
- List of technology and issues – transparent to all

Product Backlogs

- We need to start planning which specific feature we are going to put in a particular release of our software
- A prioritized list of high level requirements.

Release Planning

- Starts with product backlogs.
- Identified features that we want to put into this release called release backlogs.
- Priorities the features and estimates the working hours for each feature.
- We have a rough idea of total amount of working hours to complete the entire release.
- Must involve 2-3 subject matter experts to estimate time.



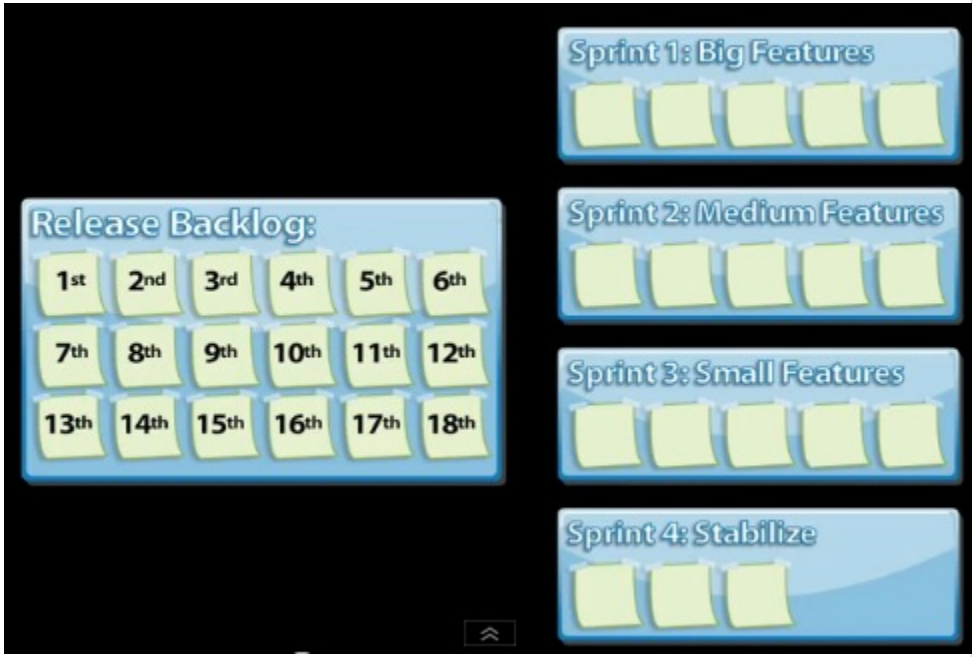
16 hours	20 hours	8 hours	12 hours	32 hours	40 hours
12 hours	16 hours	20 hours	8 hours	40 hours	20 hours
12 hours	32 hours	40 hours	12 hours	8 hours	16 hours

Estimated Work: 364 Hours

Sprints

- Starts with release backlog
- Iteration is called Sprint
- Sprints are used to manage the chunks of the product
- Each Sprint may take a couple of days to 30 days depending upon the product release cycle.
- Each release may have dozen of Sprints.

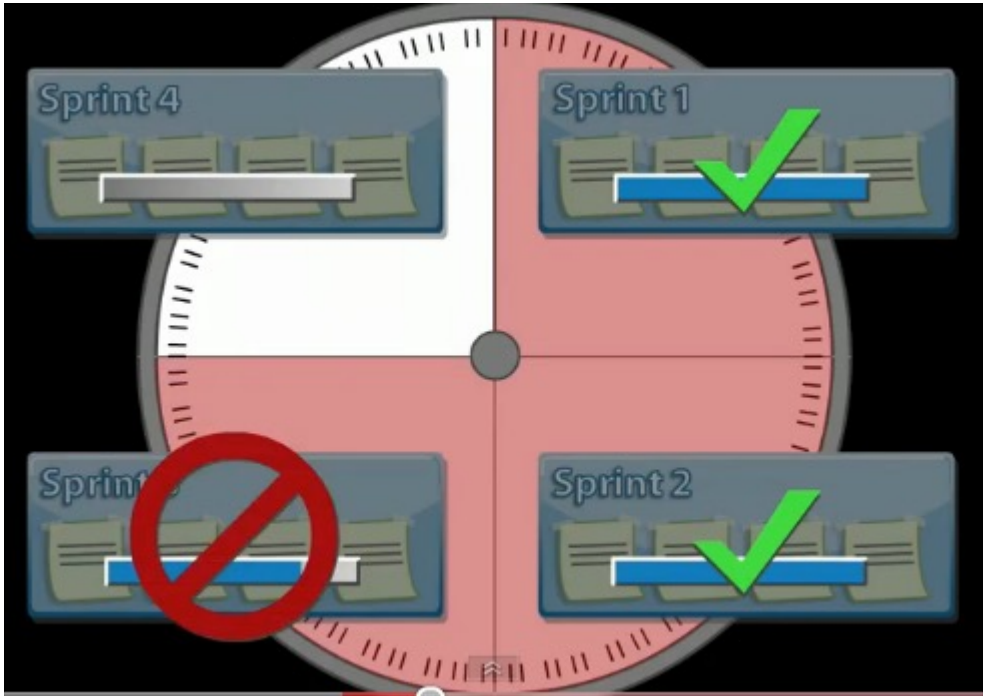
Shorter product release cycle = shorter each Sprint



3 days
30 days

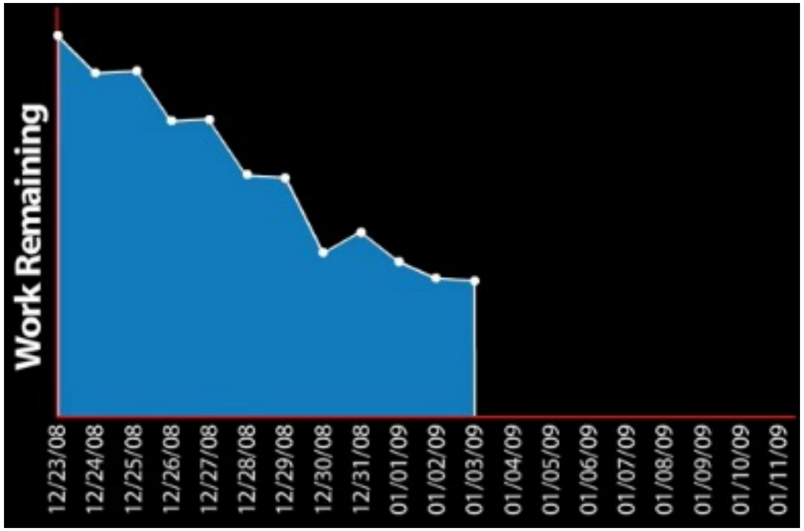
Progress Monitoring

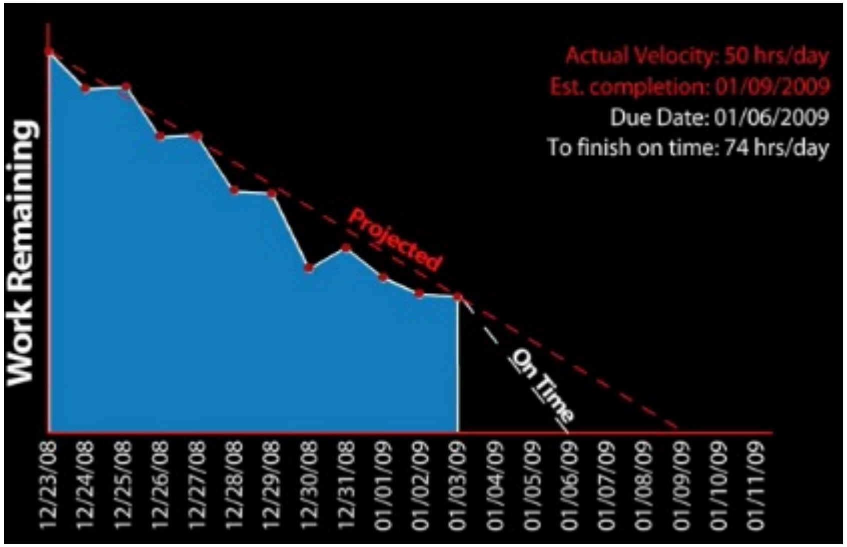
- Fully featured and tested product at the end of each Sprint…. 100% complete
- Late Sprints shows that the project is not on schedule.
- So monitor the progress of each Sprint with Burndown chart.

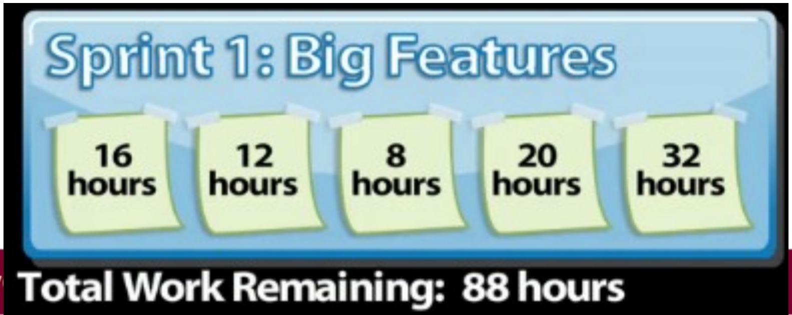


Burn-down Charts

- Project visibility tool…that project is progressing smoothly or its going to late.
- Daily progress for a Sprint over the sprint’s length
- How many hours are left to finish all the tasks?
- Teams progress is measured..need more resources.





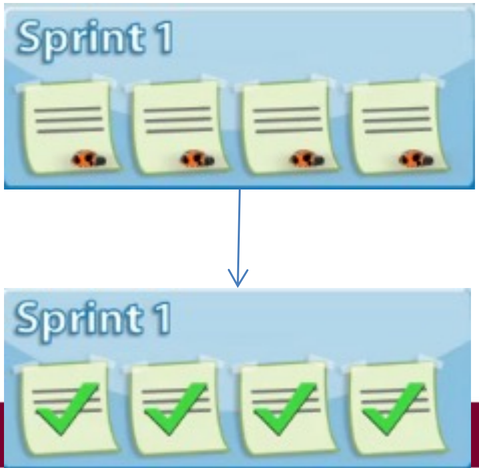


How about the Bugs?

- How to deal with the bugs in software?
- Track bugs feature by feature
  - Any bugs found related to any feature should be removed before the Sprint is released

- There may be specific Sprints that focus on Defect Backlog, which are discussed in daily meeting.

Sprint: Kill Bugs
Sprint: Kill More Bugs



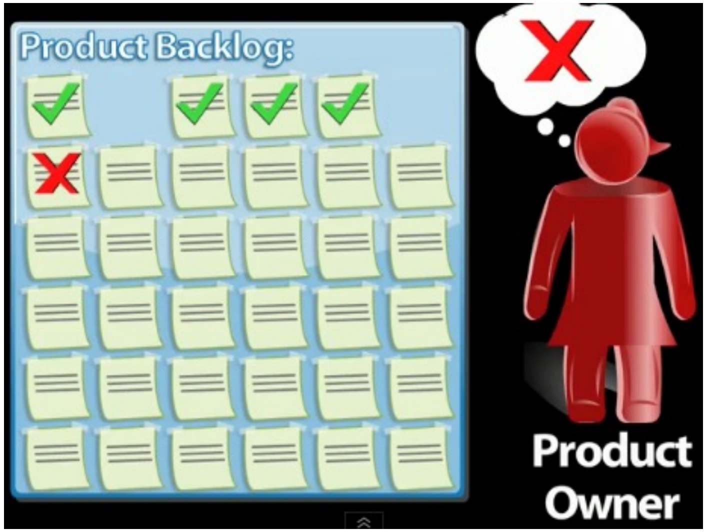
Team Roles

- Product owner
- Scrum master
- Developer
- Tester
- Customer
- Executives

Product Owner

- 99% companies do not have product owner … ☹

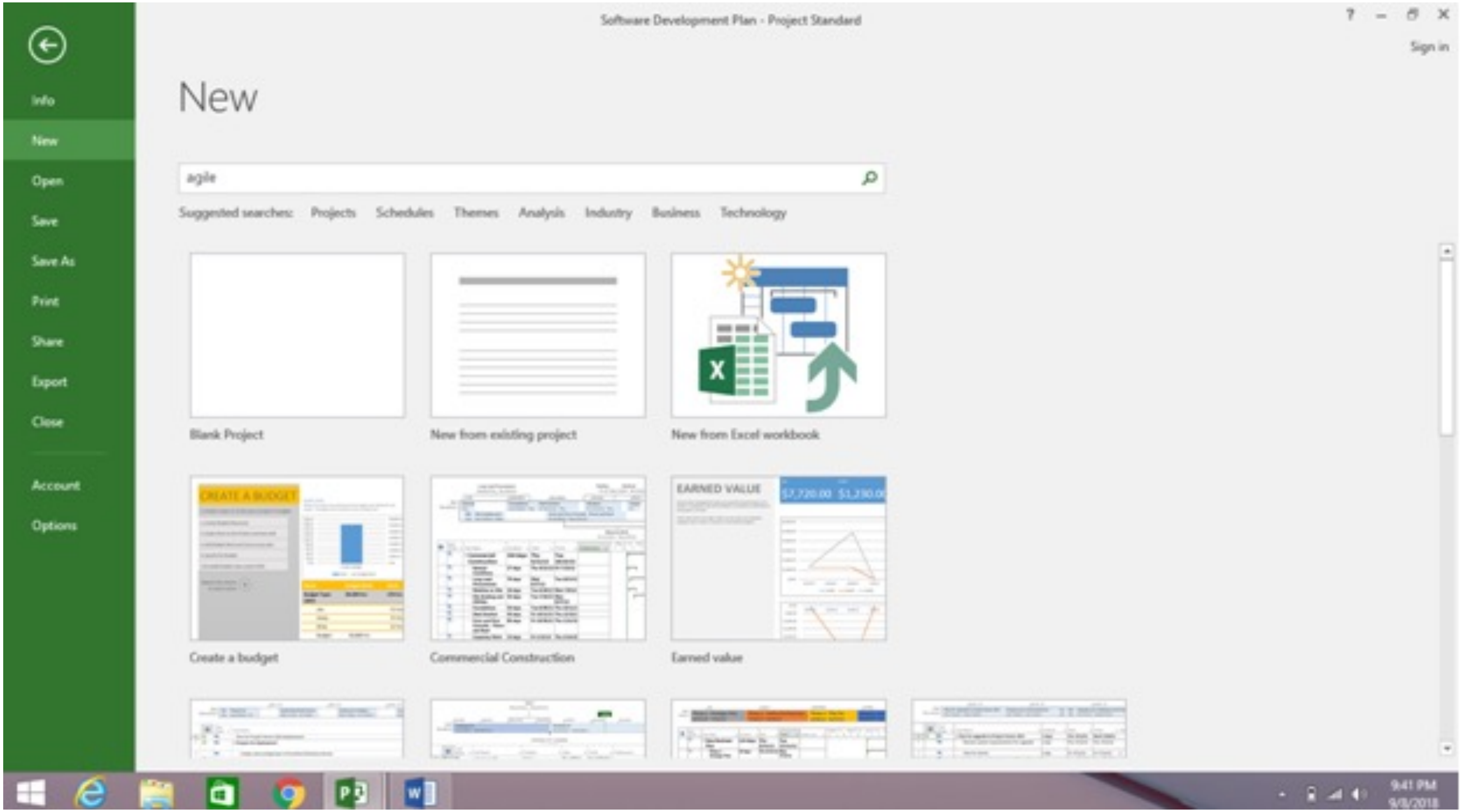
- Creates Product Backlog and Priorities Product Backlog Items
- Responsible to make sure that right features should be there in the software.
- Software should satisfy the needs of the users and customers
- Product owner sets the direction of the product.
- Accepts or rejects the work results.



Scrum Master

- Essentially a project manager
- SM makes sure that project is progressing smoothly, and
- Every team member has the tools to get their jobs done.
- Sets up meetings, release planning etc.
- Protect team members from outside disturbance

Agile Tool – MS Project

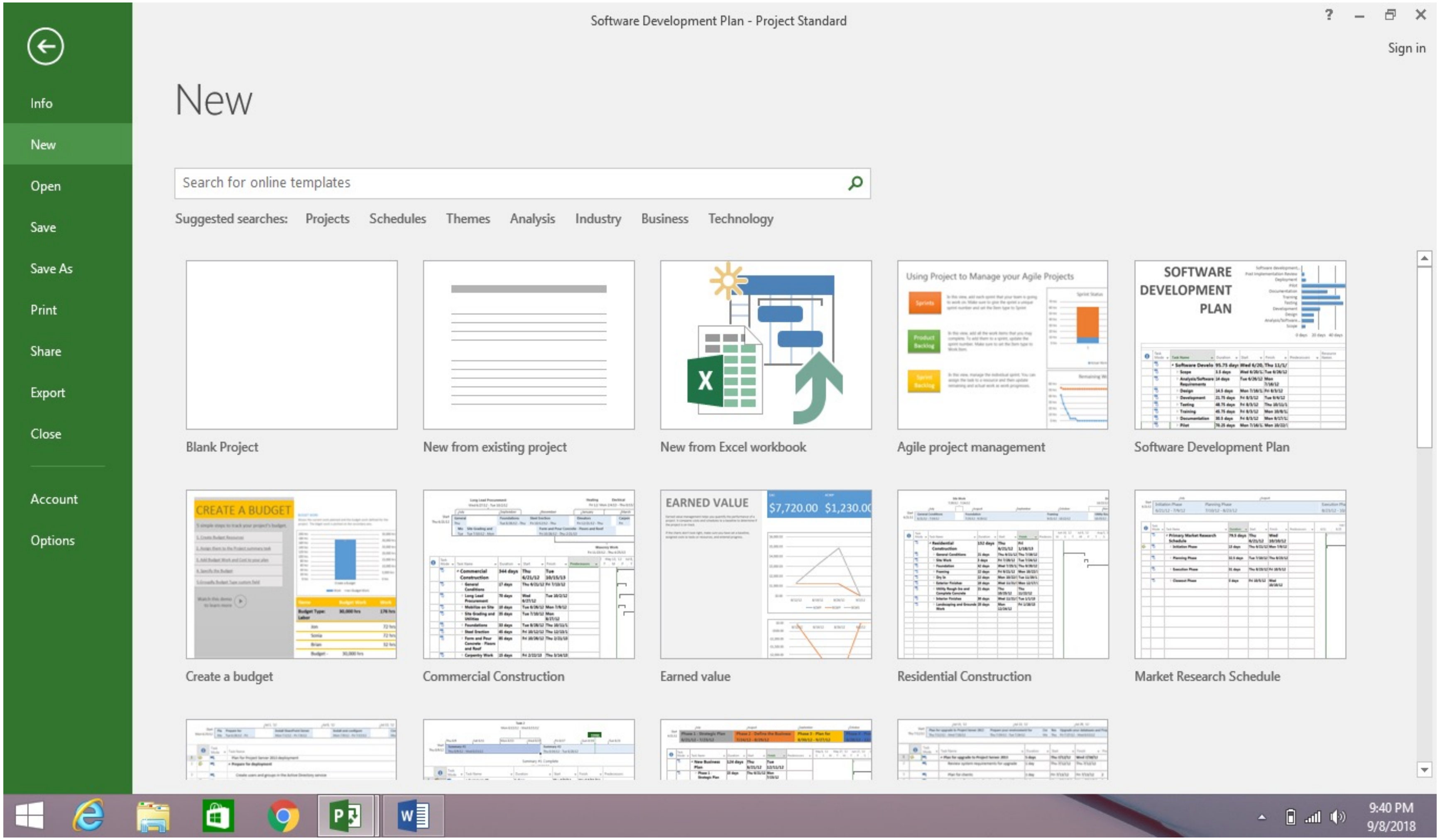


Software Development Plan - Project Standard

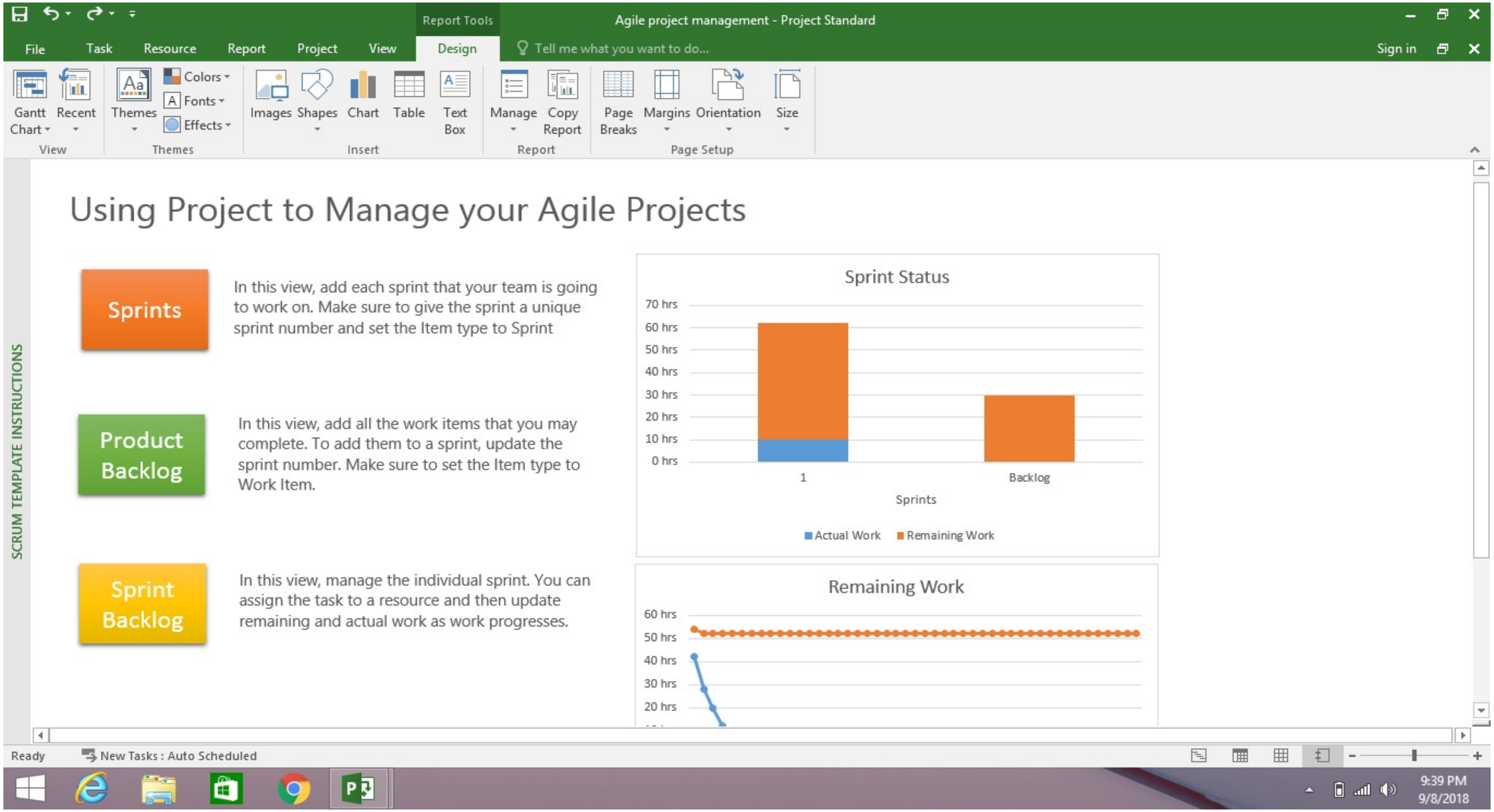
New

agile

Agile Template



Agile Template



Using Project to Manage your Agile Projects

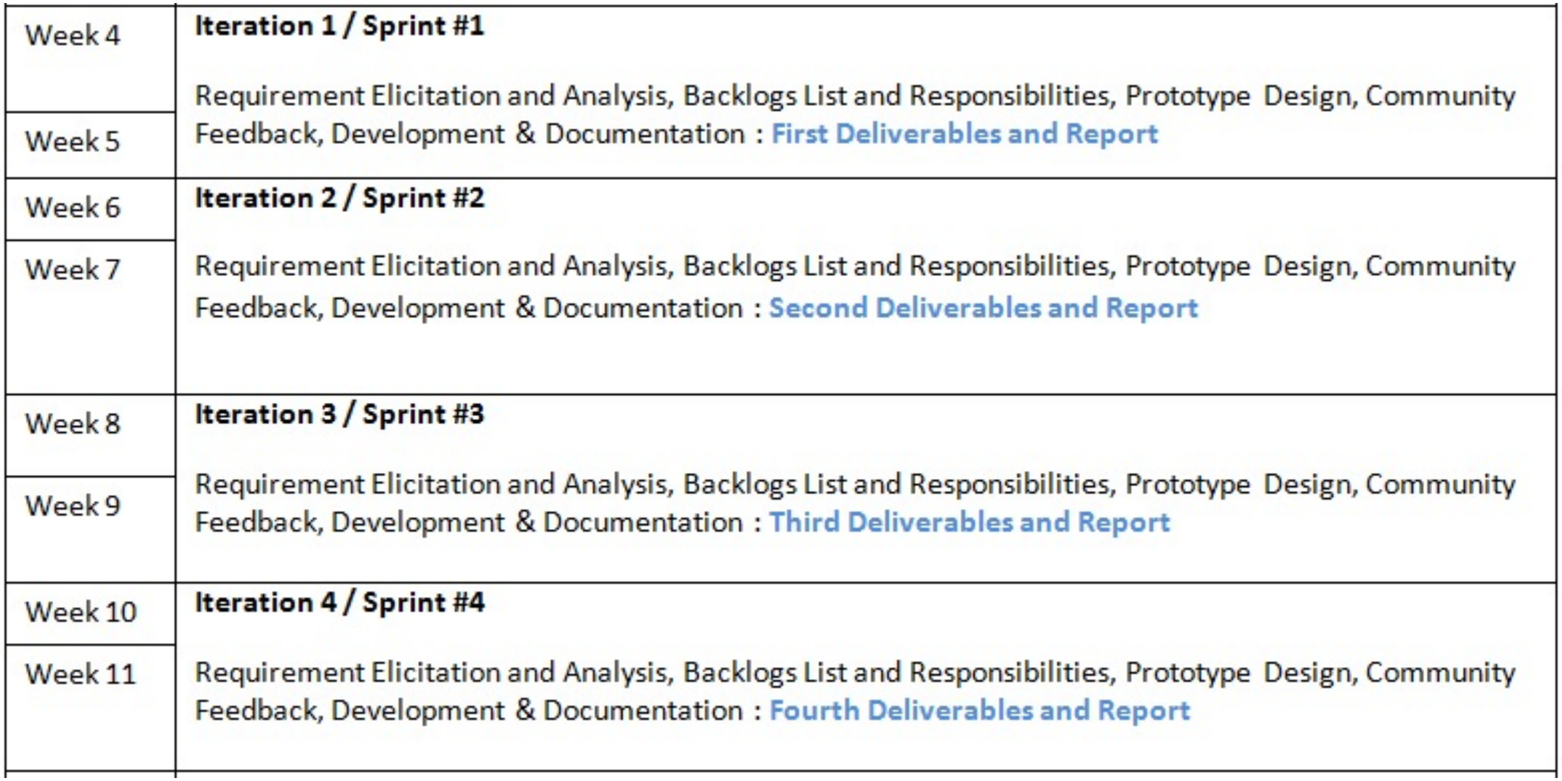
Sprints: In this view, add each sprint that your team is going to work on. Make sure to give the sprint a unique sprint number and set the Item type to Sprint

Product Backlog: In this view, add all the work items that you may complete. To add them to a sprint, update the sprint number. Make sure to set the Item type to Work Item.

Sprint Backlog: In this view, manage the individual sprint. You can assign the task to a resource and then update remaining and actual work as work progresses.

Sprint - Iteration

Each Sprint should have same and equal duration, and it should be 2 weeks as stated in Course Outline



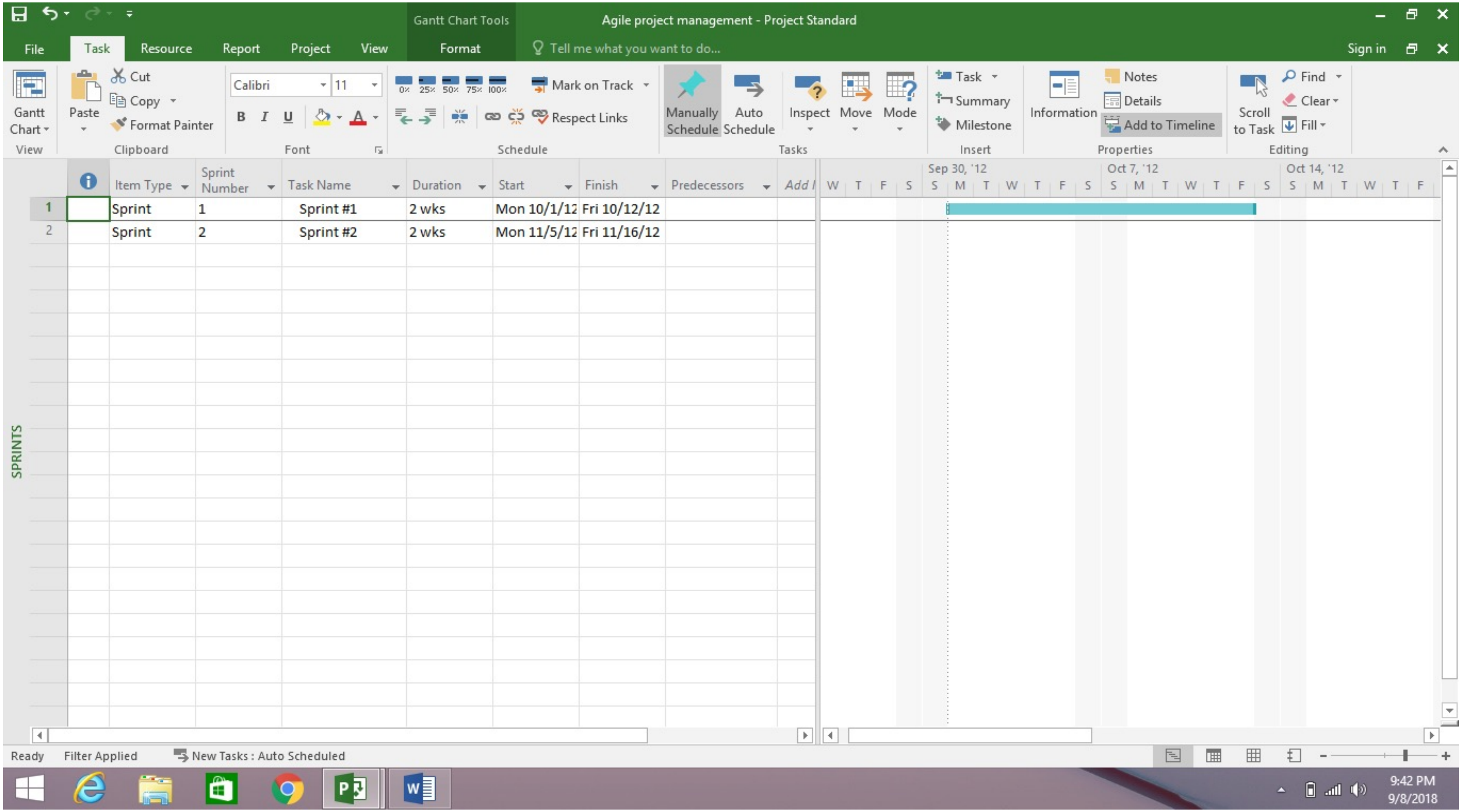
Week 4	**Iteration 1 / Sprint #1** Requirement Elicitation and Analysis, Backlogs List and Responsibilities, Prototype Design, Community Feedback, Development & Documentation : **First Deliverables and Report**
Week 5	
Week 6	**Iteration 2 / Sprint #2** Requirement Elicitation and Analysis, Backlogs List and Responsibilities, Prototype Design, Community Feedback, Development & Documentation : **Second Deliverables and Report**
Week 7	
Week 8	**Iteration 3 / Sprint #3** Requirement Elicitation and Analysis, Backlogs List and Responsibilities, Prototype Design, Community Feedback, Development & Documentation : **Third Deliverables and Report**
Week 9	
Week 10	**Iteration 4 / Sprint #4** Requirement Elicitation and Analysis, Backlogs List and Responsibilities, Prototype Design, Community Feedback, Development & Documentation : **Fourth Deliverables and Report**
Week 11	

Backlog

Product Backlog is dynamic board in which Product owner can put any feature that they requires

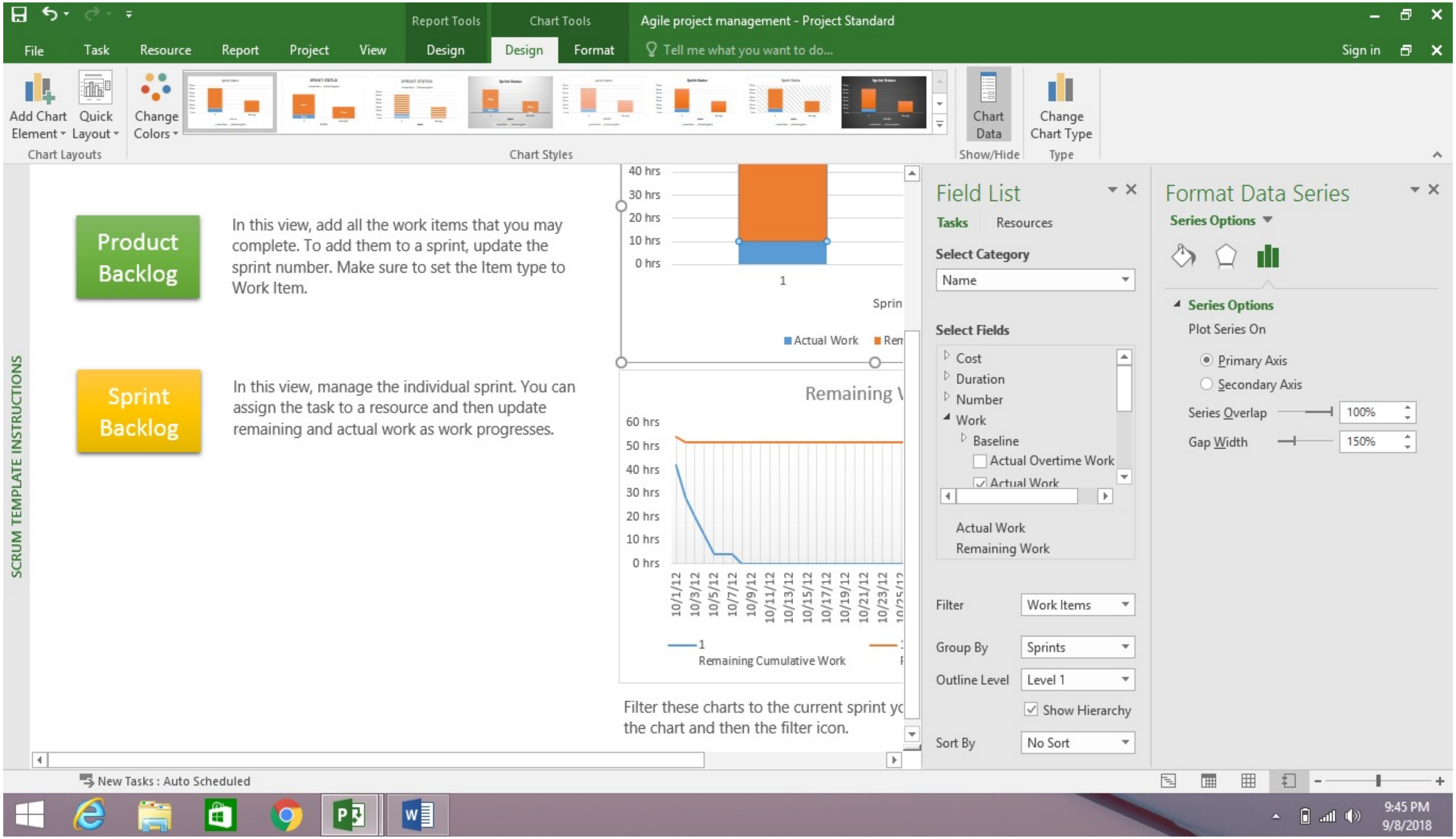
Sprint Backlog is board in which Team put features from Product Backlog (what they think that can be done in that Specific Sprint).

Sprint Template



	Item Type	Sprint Number	Task Name	Duration	Start	Finish	Predecessors	Add N
1	Sprint	1	Sprint #1	2 wks	Mon 10/1/12	Fri 10/12/12		
2	Sprint	2	Sprint #2	2 wks	Mon 11/5/12	Fri 11/16/12		

Graph Tool



Agile project management - Project Standard

Product Backlog

In this view, add all the work items that you may complete. To add them to a sprint, update the sprint number. Make sure to set the Item type to Work Item.

Sprint Backlog

In this view, manage the individual sprint. You can assign the task to a resource and then update remaining and actual work as work progresses.

Filter these charts to the current sprint yc
the chart and then the filter icon.

Field List

Select Category: Name

Select Fields

- Cost
- Duration
- Number
- Work
  - Baseline
  - □ Actual Overtime Work
  - ☑ Actual Work

Actual Work
Remaining Work

Filter: Work Items

Group By: Sprints

Outline Level: Level 1

☑ Show Hierarchy

Sort By: No Sort

Format Data Series

Series Options

Plot Series On

● Primary Axis
○ Secondary Axis

Series Overlap: 100%

Gap Width: 150%

New Tasks : Auto Scheduled