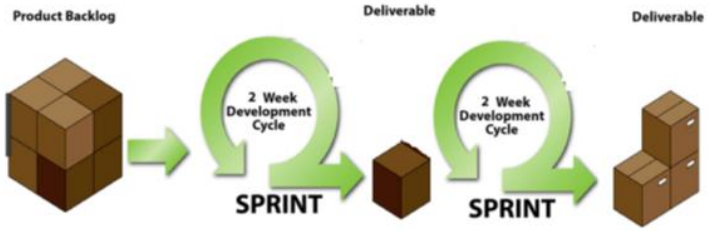
ag·ile

/ˈajəl/

adjective

1. able to move quickly and easily.
   "Ruth was as agile as a monkey"
   synonyms: nimble, lithe, spry, supple, limber, sprightly, acrobatic, dexterous, deft, willowy, graceful, light-footed, nimble-footed, light on one's feet, fleet-footed; More

2. relating to or denoting a method of project management, used especially for software development, that is characterized by the division of tasks into short phases of work and frequent reassessment and adaptation of plans.
   "agile methods replace high-level design with frequent redesign"



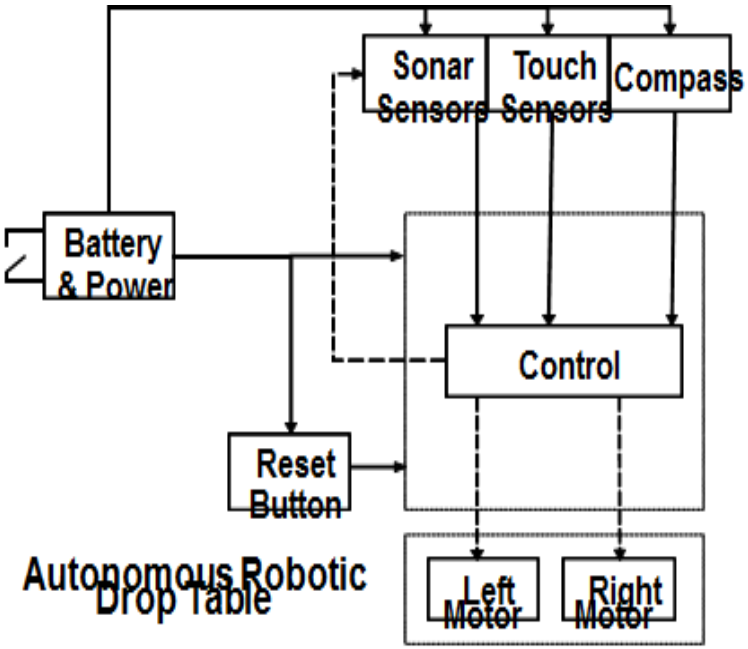
Agile Project Management
- dealing failure risks

Senior Design II

Electrical Engineering and Compute Science

Product Development – Risks

- Busboy robot project → RC car in demonstration



Product Development – Failure Risk

- Start from good solution design
- Unprepared for complexity of solution implementation
- Results: Working separate components, but not working together as a system
- Incomplete product
- **Failed delivery (to the customer)**
- How would the customer want to check to minimize the risk of not receiving the product?

Waterfall Model

- "Waterfall" Model
  - Give order (or make a contract): Pay all the money
  - Provide all the resources
  - Set the project period and delivery date
  - Wait until the time and expect to receive the product
  - What's the risk of receiving:
    - Promised product
    - Incomplete product
    - No product at all

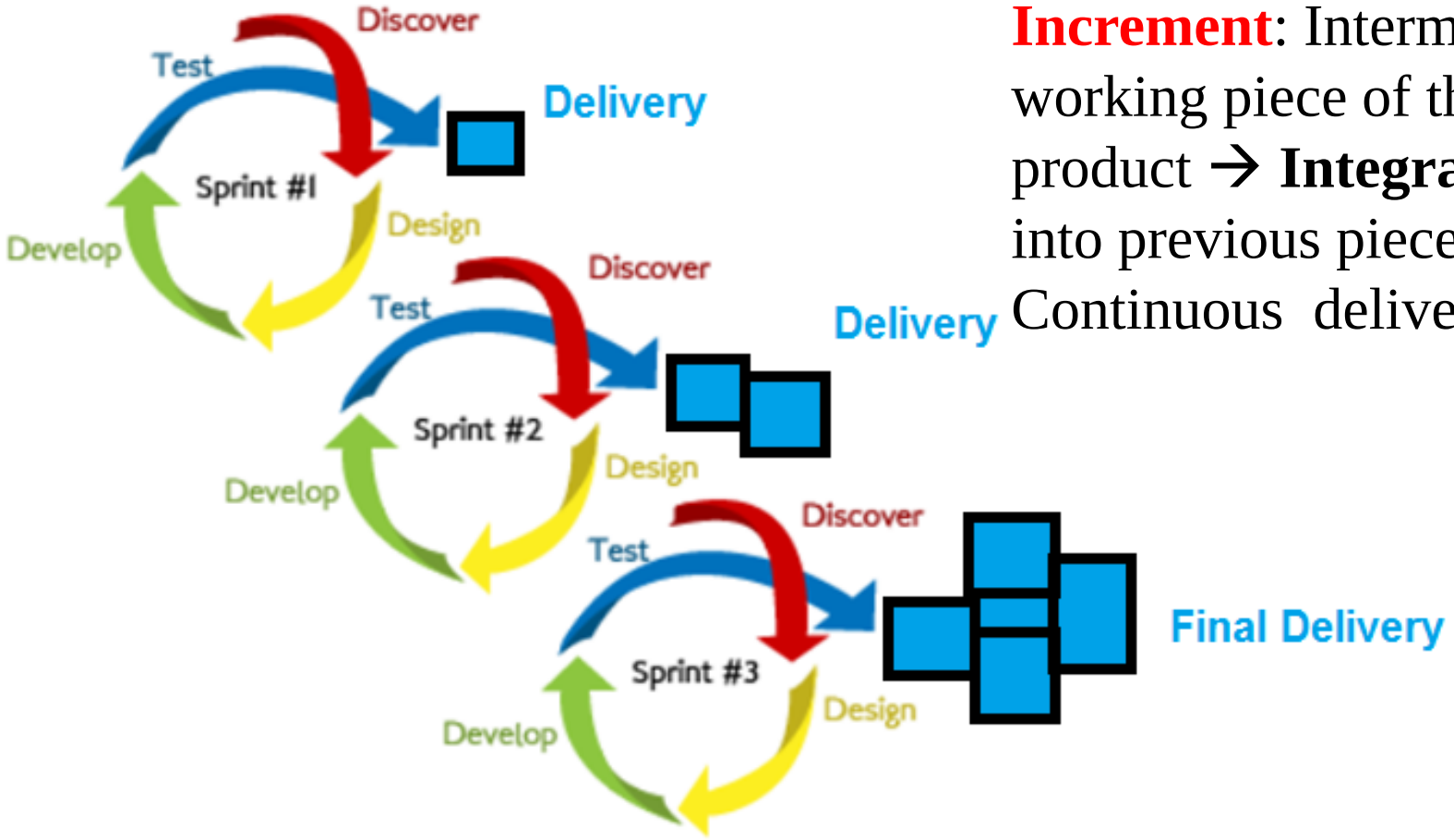
Agile Model

- "Agile" Model
  - Give order (or make a contract): pay upfront money
  - Set the project period and delivery date
  - Set the intermediate results (milestones)
    - Sub-product 1, sub-product 2, sub-product 3
  - Regular check if sub-products are delivered/completed
  - Pay only when sub-products are completed/delivered
  - What's the risk of receiving:
    - Promised product
    - Incomplete product
    - No product at all

Agile Model

- Advantages
  - Project is coordinated and organized
  - Important/essential component in the project can be prioritized
  - Continuous incremental delivery and continuous integration
  - On budget, on goal, and on-time delivery

Agile Model: essential components



Essence

Sprint: Iteration Period

Increment: Intermediate working piece of the product → **Integration** into previous piece → Continuous delivery

Agile Model for Solution Implementation

- Agile Workflow

  - Sprint: 3 weeks

  – Sprint 0:
    - Start from the “Final Solution Design Product”
    - Divide the final product into a few small pieces
  – Sprint 1:
    - Design and build the first piece
    - showcase the completion as the increment 1
  – Sprint 2:
    - Build another small piece
    - Integrated it with the increment 1
    - Showcase the increment 2
  – Sprint 3:
    - Build another small piece
    - Integrate it with the increment 2
    - showcase the increment 3
  – Final Product

Agile Model Example

- Customer/Project Manager point of view
- 1. Final Solution Product
  - Tic-Tac-Toe playing robot
- 2. Divide in to intermediate working pieces/hardware (with due dates) which, combined together, lead to the final product
  - Sprint 1: Robot-Arm with camera (due: MM/DD) – “Increment 1”
  - Sprint 2: Robot-Arm lifting and placing X/O piece in the designated board location (due: MM/DD) – “Increment 2”
  - Sprint 3: Playing against person (the customer, or the project manager) (due: MM/DD) – “Increment3 – Final product”

Class Schedule for Agile Model for Solution Implementation

- **Sprint 0 (Week of Jan 21):**
  - **Start from "The Final Solution Design Product"**
  - Divide the final product in to 3 working pieces: "**Integration"** in mind
  - Each sprint takes 3 weeks
- Sprint 1: Jan 28 – Feb 17 (increment 1)
  - **Progress Presentation 1 (T) Feb 18**
- Sprint 2: Feb 18 – Mar 17 (increment2)
  - **Progress Presentation 2 (T) Mar 18**
- Sprint 3: Mar 18 – Apr 7 (increment 3)
  - **Progress Presentation 3 (T) Apr 8**
- **EECS Day (F) April 18**

Team Activity for Agile Model of Solution Implementation

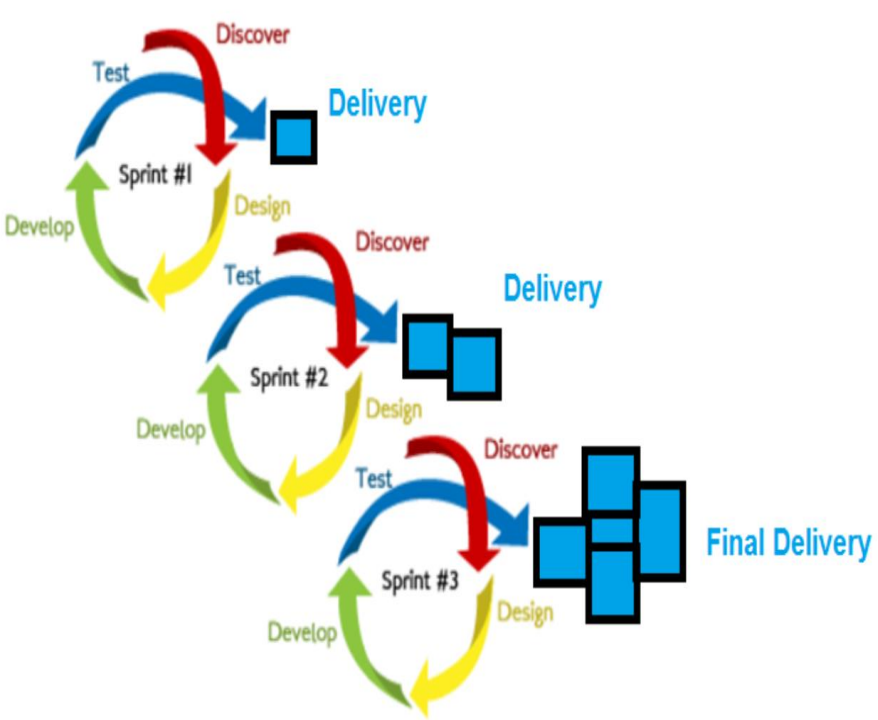
- Use the form (provided in the next page)
- Instruction
  - Take a customer's (or sponsor's) point of view
  - What intermediate working hardware piece do you want to see after the first 3 weeks? → Increment 1
  - What intermediate working hardware piece do you want to see after the next 3 weeks? → Increment 2
  - What is the final product do you expected to see after the third 3-week period? → Increment 3 (namely, the final product)
- Fill the 3 boxes of sprints with the increments
- **Submission required (by team leader)**

Agile Workflow (Part A: Sprint/Increment Delivery)

EECE404 Senior Design II

404 Agile Workflow Form

Team Name	
Final Product	



Starting Date of Week	Sprint #	Increment (or intermediate working component/piece/hardware)
1/27/2024	1	
2/3/2024		
2/10/2024		
2/17/2024	2	
2/24/2024		
3/3/2024		
3/10/2024		
3/17/2024	3	
3/24/2024		
3/31/2024		

Agile Workflow (Part B: Weekly Development Plan)

- Agile Management workflow (Part A)
  - Small, partial delivery
  - **Customer's** point of view
  - Project manager's point of view
  - Product focus (each working piece)
    - Intermediate products → integrated to the final product

- Development Details of the product (Part B)
  - **Developer's** point of view
  - How to develop and complete the intermediate (working piece) product and integrated them
  - Task focused
    - **Weekly task distribution**
    - **Team leader's responsibility:**
      - Resource (team member) allocation
      - Task completion tracking
      - Risk identification and management

Agile Work Flow Form

EECE404 Senior Design II

404 Agile Weekly Project Implementation Plan

Team Name		
Final Solution Product		

Starting Date of Week (M)	Sprint #	Increment (or intermediate working component)	Weekly development tasks
1/27/2024	1		
2/3/2024			
2/10/2024			
2/17/2024	2		
2/24/2024			
3/3/2024			
3/10/2024			
3/17/2024	3		
3/24/2024			
3/31/2024			

Agile Work Flow Form (**Sample**)

EECE404 Senior Design II

404 Agile Weekly Project Implementation Plan

Team Name	Terminator's Arm
Final Solution Product	Tic-Tac-Toe Playing Robot

Starting Date of Week (M)	Sprint #	Increment (or intermediate working component)	Weekly development tasks
1/27/2024	1	Robot-Arm with Camera	Placement of Raspberry Pi camera in the robot arm
2/3/2024			Draw or assemble a Tic-tac-toe board
2/10/2024			Coding and testing Raspberry Pi camera for board and X/O piece recognition
2/17/2024	2	X/O piece placing Robot	Coding of Raspberry Pi for min/max algorithm for tic-tac-toe game playing
2/24/2024			Coding for robot arm grabing and placing X/O pieces in designated location
3/3/2024			
3/10/2024			Combination of min/max algorithm and piece placing code
3/17/2024	3	Game Playing Robot agaist persons	Testing of min/max game again person in a simulated environment
3/24/2024			Testing of robot playing against person
3/31/2024			Further testing

Agile Workflow

- Team Assignment

EECE404 Senior Design II Dr. Charles Kim

Team Assignment 1 (100 points) - Agile Workflow

A. Instruction:
Use the Agile Workflow Form available in the class website for this assignment.

Note that the focus is to complete a partial working product in each sprint and to plan weekly development tasks to deliver the partial working product. The former is product/customer's perspective and the latter, task/developer's perspective.

First, fill the sprint/increment boxes. Then, fill out the tasks and activities for each week of the 3-week sprint period.

B. Score Distribution and Rubric:

	Sprint/Increment	**Weekly Development Tasks**
50 pts	Each increment is a partially working product, and when added to the next increment, leads to the final product.	Weekly tasks stated are appropriate and relevant in completing the stated increment.
30 pts	Each increment is a partially working product, but when added to the next increment, may not lead to the final product.	Weekly tasks stated are not quite relevant in completing the stated increment.
10 pts	Each increment is a partially working product, but not leading to the final product.	Weekly tasks stated are completely irrelevant in completing the stated increment.
0 pt	No partial working product	No meaningful tasks and activities

C. Submission: One EMAIL submission from a team is required with the following file name: **TeamName_AgileWorkflow.xxx** .

D. Submission due: Check the webpage

E. Late submission Point Deduction (**Maximum score by submission date**)

Submission Time/Date	Maximum score
By 5:00pm submission date (Tue)	100
By 5:00pm submission date + 1 (Wed)	70
By 5:00pm submission date + 2 (Thu)	50
By 5:00pm submission date + 3 (Fri)	20
After the above	0