Conrad Provan

Part A

1. **acoustic proximity fuze**: a trigger that is triggered when a sound is heard within a specific proximity

source: [@en.wikipedia.org/wiki/Proximity\_fuze#Acoustic]

category: noun

data: acoustic sensor (static, used to listen), Trigger (dynamic, activates when sensor reads a

specific threshold.)

control: sensor tells trigger when to activate

behavior: naval mines utilize an acoustic fuze to detonate.

role: processing, process incoming data from sensor

pattern: creational, must be defined, Structural, it’s a part of a bigger system

concern: controller, gets data, and manipulates a model

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if done wrong, weapons wouldn’t work properly or even at all

presentation: a check box that is labeled and will be checked when activated

2. **acoustic sensor**: sensors that detect sound via microphone

source: [@www.sunmantechnology.com/system-ip/acoustic-sensors.html]

category: noun

data: Microphone (static, doesn’t move)

control: listens for sound and sends data to system

behavior: used to detect incoming aircrafts

role: input, gets data so that the other systems can act on that data

pattern: creational, must be defined, structural, a part of a larger system

concern: view, gets input to controller to be processed

difficulty: hard, code that can locate objects by reflecting waves off them

risk: high, if done wrong units unable to see underwater

presentation: small circle with a label, displays details when clicked on

3. **acquisition process**: the process in which a target is acquired.

source: [@en.wikipedia.org/wiki/Military\_acquisition]

category: noun

data: target (Dynamic, could be moving location), a retriever (Dynamic, going after the target)

control: target is the subject of interest, retriever goes to acquire the target

behavior: units need to preform acquisition process to acquire resources

role: processing, it’s a process

pattern: behavioral, describes the behavior of an object

concern: view, to keep track of the location of the object

difficulty: moderate, has to do with movement of objects

risk: high, if done wrong, objects might not be able to move corectly

presentation: dotted line and arrow showing path of movement, labeled

4. **active radar sensor**: a sensor that uses a radar transmitter and a receiver, to locate objects

source: [@en.wikipedia.org/wiki/Radar]

category: noun

data: receiver (static, it does not move), transmitter (static, it does not move)

control: it can send radar waves to identify useable obstacles

behavior: used to identify enemy units.

role: input, gets data so that the other systems can act on that data

pattern: creational, must be defined, structural, a part of a larger system

concern: view, gets input to controller to be processed

difficulty: hard, code that can locate objects by reflecting waves off them

risk: high, if done wrong units unable to see underwater

presentation: small circle with a label, displays details when clicked on

5. **active sonar sensor**: a sensor that uses a sound transmitter and a receiver, to locate objects

source: [@en.wikipedia.org/wiki/Sonar#Active\_sonar]

category: noun

data: receiver (static, it does not move), transmitter (static, it does not move)

control: it can send sonar waves to identify useable obstacles

behavior: used to identify enemy units.

role: input, gets data so that the other systems can act on that data

pattern: creational, must be defined, structural, a part of a larger system

concern: view, gets input to controller to be processed

difficulty: hard, code that can locate objects by reflecting waves off them

risk: high, if done wrong units unable to see underwater

presentation: small circle with a label, displays details when clicked on

6. **actuator**: a component of a machine that is responsible for moving and controlling a mechanism or

system

source: [@en.wikipedia.org/wiki/Actuator]

category: noun

data: Control signal (dynamic, the signal can change) source of energy (static the source of

energy doesn’t move)

control: it can convert energy into mechanical motion

behavior: an actuator can open a valve when signaled to

role: output, it preforms an action once it receives a signal

pattern: creational, it must be defined, structural, it is part of a larger system.

concern: model, it gets manipulated, controller, it manipulates

difficulty: moderate, must take in input, and execute and action

risk: high, if done wrong, actions could have unwanted consequences

presentation: a small switch that lights up when activated

7. **attenuation**: the reduction of the amplitude of a signal, electric current, or other oscillation.

source: [@en.wikipedia.org/wiki/Attenuation]

category: noun

data: material (Static, the material doesn’t change) the waves (Dynamic, change as the pass

through the material)

control: can be used for sound dampening

behavior: used in ships for dampening the sound of the motors

role: output, it’s a result of waves moving through a material

pattern: behavioral, describes the behavior of waves

concern: controller, controls the way waves interact with different substances

difficulty: hard, there are many different waves and different materials to account for

risk: moderate, relatively simple code

presentation: show the waves fade while going through an object

8. **battleship**: a heavy warship with extensive armor and large-caliber guns.

source: [@en.wikipedia.org/wiki/Battleship]

category: noun

data: Movement (Dynamic, changing location), Attacking (Dynamic, firing weapons)

control: it can fire weaponry, and travers the water

behavior: it’s used in military operations to attack enemy naval units

role: output, military unit used to attack and defend on water

pattern: creational, because it must be defined

concern: model because its manipulated, view because we need to see the state

difficulty: hard, it involves motion

risk: high because it involves code for motion, shooting, and targeting

presentation: a labeled green 2D outline of a boat

9. **bomb**: an explosive weapon, utilizing the exothermic reaction of explosive material

source: [@en.wikipedia.org/wiki/Bomb]

category: noun

data: explosive material (Dynamic, explodes), fuze (Dynamic, triggers the explosion)

control: it can explode

behavior: used to cause extreme damage from a distance

role: output, causes an explosion

pattern: creational, because it must be defined, structural because they can be part of other

weapons

concern: model, because it gets manipulated, view to see its state

difficulty: moderate, it involves code that effects the surrounding area

risk: high, could detonate premature, or not at all

presentation: large red circle, labeled

10. **bomber aircraft**: a military aircraft that attacks ground targets by dropping bombs

source: [@en.wikipedia.org/wiki/Bomber]

category: noun

data: Movement (Dynamic, changing location), Attacking (Dynamic, firing weapons)

control: it can attack ground targets by dropping bombs on them

behavior: it’s used to cause heavy damage to ground targets with low risk to the actual unit

role: output, military unit used to attack ground from air

pattern: creational, because it must be defined

concern: model because its manipulated, view because we need to see the state

difficulty: hard, it involves motion

risk: high because it involves code for motion, shooting, and targeting

presentation: a labeled green 2D outline of a plane

11. **countermeasure**: a measure or action taken to offset another action

source: [@en.wikipedia.org/wiki/Countermeasure]

category: noun

data: movement (Dynamic, changing location)

control: it can offset another action

behavior: used to prevent an undesirable outcome

role: output, an action taken in response to another action

pattern: behavioral, its how an object responds

concern: view, has to do with the state of the object

difficulty: hard, has to do with motion and interaction with other objects

risk: high, if done wrong, countermeasures could fail or not work

presentation: dotted line and arrow showing path of movement, labeled

12. **cross-section/reflectivity**: a measure of an objects' reflectivity

source: [@copradar.com/chapts/chapt3/ch3d6.html]

category: noun

data: reflectivity (Static, a property of an object)

control: knowing the reflectivity allows us to tell the type of material

behavior: used to tell whether something on the radar is a threat or not

role: input, data that other systems can act on

pattern: structural it is a component of another object

concern: view, sends data to the controller

difficulty: easy, just a simple property

risk: moderate, if done wrong can cause objects to be distinguished incorrectly

presentation: I don’t see a need to have a visual of this one

13. **defensive maneuver**: a type of movement employed to deny an attack from enemy weapons or units

source: [@www.flightsimbooks.com/f15strikeeagle/05\_04\_Defensive\_Maneuvers.php]

category: noun

data: attacker (dynamic, attacking), defender (Dynamic, changing location)

control: movement to deny incoming attacks

behavior: captains use defensive maneuvers to evade enemy fire

role: output, it’s a result of the input of the captain

pattern: behavioral, it is a way to manipulate an object

concern: view, has to do with the state of the ship

difficulty: moderate, involves motion of an object

risk: high, it involves motion

presentation: dotted line and arrow showing path of movement, labeled

14. **depth charge**: an anti-submarine warfare weapon

source: [@www.ussslater.org/tour/weapons/dpthchrg/dpthchrg.html]

category: noun

data: depth fuze (Dynamic, triggers explosion), charge (Dynamic, explodes)

control: it can explode at specific depths

behavior: used to attack submarines

role: output, a weapon used in response to nearby enemies

pattern: creational, because it must be defined

concern: view, to see state, model, because it is manipulated

difficulty: easy, takes in data and acts on the data

risk: moderate, if done wrong the charge could detonate to early

presentation: large red circle, labeled

15. **depth fuze**: a trigger that activates at a designated depth

source: [@en.wikipedia.org/wiki/Fuze]

category: noun

data: depth sensor (static, recording data), trigger (Dynamic, activates)

control: it can trigger a weapon to fire once something enters a specific depth.

behavior: it is used to cause weapons to activate once a target enters a specific depth.

role: processing, it takes in an input and gives out an output

pattern: behavioral, communicates between two objects

concern: controller, updates the object it’s connected to after receiving input

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if done wrong, weapons wouldn’t work properly or even at all

presentation: a check box that is labeled and will be checked when activated

16. **destroyer**: a fast, maneuverable, and long-endurance warship

source: [@en.wikipedia.org/wiki/Destroyer]

category: noun

data: Movement (Dynamic, changing location), Attacking (Dynamic, firing weapons)

control: protects larger ships, attacks enemy ship

behavior: attacks other ships, maneuvers in water

role: output, military unit used to attack and defend in the water

pattern: creational, because it must be defined

concern: model because its manipulated, view because we need to see the state

difficulty: hard, it involves motion

risk: high because it involves code for motion, shooting, and targeting

presentation: a labeled green 2D outline of a boat

17. **distance fuze**: a trigger that activates at a designated distance from a target

source: [@en.wikipedia.org/wiki/Fuze#Proximity\_fuze]

category: noun

data: distance sensor (Static, records data), trigger (Dynamic, activates)

control: it can trigger a weapon to fire once something enters a specific distance.

behavior: it is used to cause weapons to activate once a target enters a specific distance.

role: processing, it takes in an input and gives out an output

pattern: behavioral, communicates between two objects

concern: controller, updates the object it’s connected to after receiving input

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if done wrong, weapons wouldn’t work properly or even at all

presentation: a check box that is labeled and will be checked when activated

18. **engagement process**: the process in which one unit engages another unit

source: [@en.wikipedia.org/wiki/Engagement\_(military)]

category: noun

data: a target (Dynamic, it could be moving) engager (Dynamic, moving toward target)

control: the process in which one force engages another force

behavior: describes the way in an object(s) engages another object(s)

role: processing, it’s a process that will end with an outcome

pattern: behavioral, have an object behaves

concern: view, how an object moves

difficulty: moderate, has to do with movement of objects

risk: high, if done wrong, objects might not be able to move when needed

presentation: dotted line and arrow showing path of movement, labeled

19. **evasive maneuver**: movement to avoid incoming obstacles

source: [@memory-alpha.wikia.com/wiki/Evasive\_maneuvers]

category: noun

data: attacker (Dynamic, attacking) operator (Dynamic, Evading the attacker)

control: movement to avoid incoming obstacles

behavior: captains use evasive maneuvers to evade enemy fire

role: output, it’s a result of the input of the captain

pattern: behavioral, it is a way to manipulate an object

concern: view, has to do with the state of the ship

difficulty: moderate, involves motion of an object

risk: high, it involves motion

presentation: dotted line and arrow showing path of movement, labeled

20. **fighter aircraft**: a military aircraft designed primarily for air to air combat

source: [@en.wikipedia.org/wiki/Fighter\_aircraft]

category: noun

data: Movement (Dynamic, changing location), Attacking (Dynamic, firing weapons)

control: flies, and fires weapons

behavior: used in air to air military operations

role: output, military unit used to attack and defend in the air

pattern: creational, because it must be defined

concern: model because its manipulated, view because we need to see the state

difficulty: moderate, it involves motion

risk: high because it involves code for motion, shooting, and targeting

presentation: a labeled green 2D outline of a plane

21. **lethality process**: the process in which something is lethal

source: [@en.wikipedia.org/wiki/Lethality]

category: noun

data: a weapons lethality (Static, value)

control: the process that makes a weapon lethal

behavior: a missile being fired at a target

role: processing, it’s a process

pattern: behavioral, it describes the behavior of an object

concern: controller, it manipulates a model

difficulty: hard, since the process can very based on the weapon or object

risk: high, if done wrong weapons would not function as expected

presentation: I don’t see a need to have a visual of this one

22. **main battery gun**: the primary weapon or group of weapons around which a warship is designed

source: [@en.wikipedia.org/wiki/Main\_battery]

category: noun

data: aiming (Dynamic, changing targets), firing (Dynamic, attacking)

control: can aim and launch projectiles at targets, dynamic, it moves

behavior: used to attack enemy units in time of battle

role: output, it is a weapon that supports in attacking and defending

pattern: creational because it must be defined, structural because it’s a part of warships

concern: model because its manipulated, view because we need to see the state

difficulty: moderate, it involves motion

risk: high because it involves code for motion, shooting, and targeting

presentation: red labeled cylinder

23. **missile**: guided, self-propelled system with a warhead

source: [@en.wikipedia.org/wiki/Missile]

category: noun

data: guiding system (dynamic, adjusting trajectory), rocket (Dynamic, changing the location),

warhead (Dynamic, explodes)

control: it can propel itself to a target and explode

behavior: used to inflict large amounts of damage to enemies

role: output, it’s a weapon for destroying stuff

pattern: creational, because it must be defined, behavioral, because the guiding system

concern: model, because it’s something that’s manipulated.

difficulty: hard, its composed of many sub systems that all must work together

risk: high risk because of all the different components having to work together

presentation: a labeled green 2D outline of a missile

24. **mobility process**: the process in which a weapons system or combat unit moves

source: [@en.wikipedia.org/wiki/Mobility\_(military)]

category: noun

data: location (Static, location to be moved to)

control: it can move a combat unit to a military objective

behavior: moving a ship to a location requested

role: output, its how a ship moves from one location to another

pattern: behavioral, how a ship behaves

concern: view, alters the state of the ship

difficulty: moderate, must deal with moving objects

risk: moderate, must hand code for movement

presentation: dotted line and arrow showing path of movement, labeled

25. **munition**: materials of war, weapons, ammunition, armaments

source: [@en.wiktionary.org/wiki/munition]

category: noun

data: materials of war (Dynamic, they get used)

control: can be used to attack or defend in military combat

behavior: used in military combat to attack and defend

role: input, because they get used

pattern: creational, because they must be defined

concern: model, they get manipulated

difficulty: moderate, each one needs to be defined

risk: high, if done wrong the actions of the munition wouldn’t work

presentation: red labeled square

26. **offensive maneuver**: a type of maneuver to put a ship in an offensive position

source: [@en.wikipedia.org/wiki/Basic\_fighter\_maneuvers]

category: noun

data: a target (Dynamic, it could be moving) attacker (Dynamic, moving toward target)

control: helps an attacker get the upper hand in a confrontation

behavior: a captain uses an offensive maneuver to get the upper had on the enemy ship

role: output, it’s a result of the input of the captain

pattern: behavioral, it is a way to manipulate an object

concern: view, has to do with the state of the ship

difficulty: moderate, involves motion of an object

risk: high, it involves motion

presentation: dotted line and arrow showing path of movement, labeled

27. **passive radar sensor**: a sensor that picks up radar waves without giving any off

source: [@en.wikipedia.org/wiki/Passive\_radar]

category: noun

data: receiver (Static, reads waves)

control: reads radar waves that transmit form third party transmitters

behavior: used to detect objects or enemy ships without being detected

role: input, it collects data

pattern: creational because it must be defined

concern: controller, updates the object it’s connected to after receiving input

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if done wrong, weapons wouldn’t work properly or even at all

presentation: small circle with a label, displays details when clicked on

28. **passive sonar sensor**: sensor that reads sonar waves without giving any off

source: [@en.wikipedia.org/wiki/Sonar#Passive\_sonar]

category: noun

data: receiver (Static, reads waves)

control: it can listen to sonar waves, without transmitting any

behavior: used to listen for enemy subs or mines

role: input, it collects data

pattern: creational because it must be defined

concern: controller, updates the object it’s connected to after receiving input

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if done wrong, weapons wouldn’t work properly or even at all

presentation: small circle with a label, displays details when clicked on

29. **power**: a quantitative measurement of energy

source: [@https://en.wikipedia.org/wiki/Power\_(physics)]

category: noun

data: amount of energy (Dynamic, the amount of energy can change)

control: it can cause damage, be read by sensors, or used to cause actions

behavior: heat sensors read the amount of power in the form of temperature

role: input, when being read as data, output when being used to cause an action

pattern: creational, because it must be defined, structural because it is a part of some objects

concern: model because it can be manipulated, view so we can see the state

difficulty: easy, this is more of an attribute to be read

risk: high, if done wrong interactions between objects can fail

presentation: I don’t see a need to have a visual of this one

30. **radar proximity fuze**: a trigger that activates when radar waves come within range

source: [@en.wikipedia.org/wiki/Fuze#Proximity\_fuze]

category: noun

data: radar sensor (static, reads data), trigger (Dynamic, activates)

control: it can trigger a weapon to fire after once something enters its radar.

behavior: it is used to cause weapons to activate once an object enters a specific radar.

role: processing, it takes in an input and gives out an output

pattern: behavioral, communicates between two objects

concern: controller, updates the object it’s connected to after receiving input

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if done wrong, weapons wouldn’t work properly or even at all

presentation: a check box that is labeled and will be checked when activated

31. **sensor**: a data collection device

source: [@en.wikipedia.org/wiki/Sensor]

category: noun

data: sensor (Dynamic, reads data)

control: can collect data and report that data to another system

behavior: used to collect data, and report to different systems

role: input, it collects data

pattern: creational because it must be defined

concern: view, because it sends input to the controller

difficulty: easy, all it must do is send data

risk: low, not any moving parts

presentation: small circle with a label, displays details when clicked on

32. **sensor fusion**: software made to combine data from multiple sensors

source: [@en.wikipedia.org/wiki/Sensor\_fusion]

category: noun

data: data (Static, inputted data)

control: able to combine data from many sensors

behavior: used to combine data do there are less uncertainties

role: processing, because it’s manipulating the data it receives.

pattern: behavioral, because its acting on input to perform a function

concern: controller, because it acts on data

difficulty: hard, combining multiple sets of data and making it all work has many ways to fail

risk: high, if done wrong it could cause issues in many other places

presentation: I don’t see a need to have a visual of this one

33. **submarine**: a vehicle able to maneuver under and on top of water

source: [@en.wikipedia.org/wiki/Submarine]

category: noun

data: composed of many systems, like maneuvering, weapons, ect (Dynamic, because there is

motion)

control: it can dive under water, rise above water, change direction and launch weapons

behavior: they are used to survey waters and create blockades from enemies

role: output, because it is a vehicle used for military practices

pattern: creational because it must be defined, structural because it is made of many parts

concern: model because it is something manipulated

difficulty: hard, because it is made up of many smaller parts

risk: high because if any part is wrong it could cause issues.

presentation: a labeled green 2D outline of a submarine

34. **thermal proximity fuze**: an object to trigger another object do to temperature

source: [@en.wikipedia.org/wiki/Fuze#Proximity\_fuze]

category: noun

data: thermal sensor (Static, just collects data) trigger (Dynamic, triggers action)

control: it can trigger a weapon to fire after once it reaches a specific temperature.

behavior: it is used to cause weapons to activate once a the fuze hits a specific temperature.

role: processing, it takes in an input and gives out an output

pattern: behavioral, communicates between two objects

concern: controller, updates the object it’s connected to after receiving input

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if done wrong, weapons wouldn’t work properly or even at all

presentation: a check box that is labeled and will be checked when activated

35. **thermal sensor**: a data collection device that collects data on temperature

source: [@www.cpinc.com/Trerice/Temperature/63%20-%2064%20temperature.pdf ]

category: noun

data: data collector (Static, does not move)

control: it collects data of temperature and sends that data off to be processed

behavior: takes in data and sends data to be analyzed

role: input, collects data and sends it to process

pattern: behavioral, used to determine the behavior of what’s it connected to.

concern: controller, because it manipulates how the model should behave

difficulty: easy, should just be a simple piece of data collection script

risk: low risk because it shouldn’t be all that har to write

presentation: small circle with a label, displays details when clicked on

36. **timed fuze**: a trigger that activates after a set period

source: [@en.wikipedia.org/wiki/Fuze#Time\_fuze]

category: noun

data: timer (dynamic, timer changes), trigger (dynamic, used to activate)

control: it can trigger a weapon to fire after a set period.

behavior: it is used to be able to delay the activation of a weapon after its been triggered.

role: processing, it takes in an input and gives out an output

pattern: behavioral, communicates between two objects

concern: controller, updates the object it’s connected to after receiving input

difficulty: easy, takes an input, the processes the input and provides an output

risk: moderate, if down wrong, weapons wouldn’t work properly or even at all

presentation: a check box that is labeled and will be checked when activated

37. **torpedo**: a self-propelled weapon with an explosive warhead

source: [@en.wikipedia.org/wiki/Torpedo]

category: noun

data: thruster (dynamic, used to move the whole object), warhead (dynamic, it explodes)

control: it can propel its self through water and explode either on contact with an object or in

proximity to an object

behavior: used in war to damage enemy ships

role: output, it is a result of

pattern: behavioral, because this acts on an object

concern: controller, because it responds to input and acts on another object

difficulty: moderate, this must respond to one object and act on another object

risk: moderate risk, since it has to interact with other object giving opportunity for failure.

presentation: small red triangle with a T in the middle

38. **triangulation**: a process using geometry using triangles to locate an object

source: [@en.wikipedia.org/wiki/Triangulation]

category: noun

data: known objects (static, not moving), unknown object (dynamic, could be moving)

control: it can find location of points by forming triangle to it from known points

behavior: used to locate ships or objects of interest

role: processing because it is a process using data from the environment

pattern: behavioral because it’s a process acting on data

concern: controller because it responds to the input given

difficulty: easy because it’s just a simple math mathematical equation

risk: moderate, if someone were to mess up the equation it would not work

presentation: show the triangles crated from each object

39. **trilateration**: a process using geometry to locate objects

source: [@www.revolvy.com/page/Trilateration]

category: noun

data: known objects (static, not moving), unknown object (dynamic, could be moving)

control: it can find location of points by measurement of distances using geometry

behavior: used to locate ships

role: processing because it is a process using data from the environment

pattern: behavioral because it’s a process acting on data

concern: controller because it responds to the input given

difficulty: easy because its just a simple math mathematical equation

risk: moderate, if someone where to mess up the equation it would not work

presentation: show the geometry being used from each object

Total Word Count: 4193

Part B

**Vehicles**

Battleship

bomber aircraft

destroyer

fighter aircraft

submarine

**Weapons**

Torpedo

Munition

Missile

main battery gun

depth charge

bomb

**Sensors**

active radar sensor

active sonar sensor

acoustic sensor

passive radar sensor

passive sonar sensor

sensor

sensor fusion

thermal sensor

**Fuzes**

timed fuze

thermal proximity fuze

radar proximity fuze

distance fuze

depth fuze

acoustic proximity fuze

**Processes**

acquisition process

engagement process

lethality process

mobility process

**Maneuvers**

Countermeasure

defensive maneuver

evasive maneuver

offensive maneuver

**Calculations**

Triangulation

Trilateration

**Miscellanies**

Actuator

Attenuation

Power

cross-section/reflectivity