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CS603 Assignment 1 Solution

Fall 2026

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CS603 — Software Architecture and Design

Assignment No. 1 — Fall 2026

ShipSync is an on-demand logistics platform where customers schedule shipments with delivery partners. Each shipment manages its route and pricing through a transport mode, and every shipment must calculate its total shipping cost, initiate transit, and generate a shipment manifest.

1. Classes identified (5 marks)

Class	Attributes	Methods
Customer	customerID, name, address, phoneNo	scheduleShipment(), trackShipment()
DeliveryPartner	partnerID, name, contactNo, availability	acceptShipment(), updateStatus()
Shipment	shipmentID, origin, destination, weight, status	calculateShippingCost(), initiateTransit(), generateManifest()
Manifest	manifestID, shipmentDetails, totalCost	printManifest()
TransportMode (abstract)	modeID, modeName	calculateRate(), initiateTransit()
StandardCourierVan	registrationNo, driverDetails, baseRate, totalMileage	calculateCost()
AutonomousDeliveryDrone	batteryLevel, altitudeLimit, iotProtocol	issueTakeoffCommand(), calculateCost()
FreightCargoTruck	freightCorridor, maxPayload, containerSlots	reserveContainerSlot(), calculateCost()

Route details (origin and destination) are kept as attributes of Shipment, and pricing is handled through the polymorphic rate methods of the transport modes, so no separate Route or Pricing class is needed.

2. Relationships between classes (5 marks)

• Customer places Shipment (association, 1 to many): one customer schedules many shipments.

• DeliveryPartner delivers Shipment (association, 1 to many): one partner delivers many shipments.

• Shipment uses TransportMode (association, many to 1): each shipment uses one transport mode, while one mode serves many shipments.

• TransportMode is the parent of StandardCourierVan, AutonomousDeliveryDrone and FreightCargoTruck (inheritance / generalization): each subclass inherits mode behaviour and adds its own attributes and rate logic.

• Shipment creates Manifest (composition, 1 to 1): the manifest belongs to its shipment and has no meaning without it.

• Rate calculation is polymorphic: calculateRate() is defined in TransportMode and implemented differently in each subclass — base rate plus mileage for vans, weight plus flight time for drones, and freight rules for trucks.

3. Class diagram (10 marks)

