AFRICAN CENTER OF EXCELLENCE IN DATA SCIENCE (ACE-DS)

PROGRAMME: MSC PROGRAM IN DATA SCIENCE, DATA MINING

ACADEMIC YEAR: 2025-2026

YEAR STUDY: 2

SEMESTER: 1

MODULE CODE: DSC6235

MODULE TITLE: ADVANCED DATABASE TECHNOLOGY

CAT1

REGISTRATION NUMBER	NAMES
218001170	NZAMWITA OLIVIER

DATE: 15TH OCTOBER 2025

CASE STUDY 25: Construction Project Cost and Resource Management

1. CREATE TABLE Contractor(ContractorID int AUTO_INCREMENT primary key, Name varchar(50) not null, Contact varchar(20) not null, Company varchar(100) not null, ExperienceYears int not null);
   create table Project(ProjectID int AUTO_INCREMENT primary key, ContractorID int, Name varchar(150) not null, Location varchar(50) not null, StartDate date not null, EndDate date not null, Budget float(10.0) not null)
   alter table project add CONSTRAINT budget CHECK (budget>0);

   create table Material(MaterialID int AUTO_INCREMENT primary key, ProjectID int, MaterialName varchar(200) not null, Cost float not null, Quantity int not null, Supplier varchar(200));

   create table Equipment(EquipmentID int AUTO_INCREMENT primary key, ProjectID int, Name varchar(200), CostPerDay float not null, Status varchar(50));

   create table Expense(ExpenseID int AUTO_INCREMENT primary key, ProjectID int, Description varchar(250), Amount float(10,2) not null, Exp_Date date not null);

   create table Payment(PaymentID int AUTO_INCREMENT primary key, ContractorID int, ProjectID int, Amount float(10.2) not null, PaymentDate datetime not null, Method varchar(50) not null);
   ALTER TABLE `project` DROP FOREIGN KEY `project_ibfk_1`; ALTER TABLE `project` ADD CONSTRAINT `project_ibfk_1` FOREIGN KEY (`ContractorID`) REFERENCES `contractor`(`ContractorID`) ON DELETE CASCADE ON UPDATE CASCADE;

2. ALTER TABLE `material` ADD FOREIGN KEY (`ProjectID`) REFERENCES `project` (`ProjectID`) ON DELETE CASCADE ON UPDATE CASCADE;

   alter table equipment add CONSTRAINT foreign key (projectid) references project(projectid) on DELETE CASCADE on UPDATE cascade;

   ALTER TABLE `expense` ADD FOREIGN KEY (`ProjectID`) REFERENCES `project`(`ProjectID`) ON DELETE CASCADE ON UPDATE CASCADE;

   ALTER TABLE `payment` ADD FOREIGN KEY (`ProjectID`) REFERENCES `project` (`ProjectID`) ON DELETE CASCADE ON UPDATE CASCADE;

   ALTER TABLE `payment` ADD FOREIGN KEY (`ContractorID`) REFERENCES `contractor`(`ContractorID`) ON DELETE CASCADE ON UPDATE CASCADE;

3. insert into contractor (`Name`, `Contact`, `Company`, `ExperienceYears`) values ("John kenned","0788509213","horizon",10), ("KAYITARE Aman","0788563354","NPD",15), ("RWAGASORE","0780694975","CWC Rwanda",5);

   insert into project (`ContractorID`, `Name`, `Location`, `StartDate`, `EndDate`, `Budget`) VALUES (1,"kigali green Project","kigali CBD",2024-1-1,2027-12-31,30), (1,"Akanyaru Multipurpose Dam","Akanyaru river",2022-1-1,2025-12-31,44), (2,"Rusumo HydroElectric power station","rusumo falls",2017-1-1,2030-12-31,100), (2,"Kigali Innovation City (KIC)","Special Economic Zone",2025-1-1,2030-12-31,27), (3,"Kigali Urban Transport Improvement project(KUTI)","Kigali",2025-1-1,2030-12-31,60);

4. select budget from project group by name;
5. update equipment set status = "Repaired";
6. select * from project where budget > budget*80/100;
7. create view total_payment as select * from project group by contractorid;

8. CREATE TRIGGER check_project_budget BEFORE INSERT ON Expense FOR EACH ROW BEGIN DECLARE total_expenses DECIMAL(10,2); DECLARE project_budget DECIMAL(10,2);

   SELECT IFNULL(SUM(Amount), 0) INTO total_expenses FROM Expense WHERE ProjectID = NEW.ProjectID;

   SELECT Budget INTO project_budget FROM Project WHERE ProjectID = NEW.ProjectID;

   budget IF (total_expenses + NEW.Amount) > project_budget THEN SIGNAL SQLSTATE '45000' SET MESSAGE_TEXT = 'Error: Total expenses exceed the project budget.'; END IF; END;

8. CREATE TRIGGER check_project_budget BEFORE INSERT ON Expense FOR EACH