**The questions in this exam are on the Autonomous Recruitment Agent (ARA), whose description is given below:**

Autonomous Recruitment Agent (ARA) is an AI-based fully autonomous recruitment agent. ARA collects information from job seekers and companies with job openings, matches the job seekers with job openings and gets money from the companies for its service. ARA has a basic user interface, which will be highlighted in its TV adds:

İş bulmak istiyorsan, ARA… (If you want a job, ARA)

Kaydol, CV yükle, onayla… (Register, Upload CV, confirm)

Sadece 3 adımda… (Just in 3 steps)

A job seeker first registers with a name, surname and an email address which is validated during the registration. Then, the job seeker uploads a CV. To complete the upload, the job seeker should agree to the General Data Protection Regulation (GDPR) and the Terms and Conditions. Job seeker can replace his/her CV on ARA with a new one by simply uploading a new CV after logging in. Optionally, the job seeker can enter the names of companies that his/her CV should be hidden from, such as the present employer while uploading the CV. Applications without a CV is invalid and the job seeker without a valid CV is removed immediately.

Each new CV is automatically evaluated with Natural Language Processing (NLP) Techniques and scored from 0 to 100 by ARA, based on the academic and professional excellence and experience of the candidate, as well as the authenticity, correctness and coherence of the CV. This CV Score is not visible to the job seeker, but ARA can provide AI-based personalized guidance to the job seeker to improve the CV at a cost of 50$. If a CV Score is less than 10, that job seeker is removed from the system and the job seeker is notified.

Companies also register by filling in a simple form that requires the company name, company website and an email address which is validated during the registration. This email address should contain “HR" or "human resources” related terms and belong to the company domain. Registered companies can send a text-based job description, detailing the job and the required qualifications. Companies can view all of their own job descriptions, update or delete them if they like. Each job description has a unique number.

Companies can become a Gold Company if they pay 1000$/year, and Diamond Company if they pay $2000/year. Gold and Diamond companies can view other job descriptions similar to theirs. Diamond companies can ask to be given priority while finding candidates for their own job openings.

ARA semantically compares the job description with all the CVs and creates a Matching Score for all job seekers from 0 to 100 for each job description. Matching Score and CV Score are then multiplied to give the Final Score of a job seeker for that job description. Top 10 job seekers according to their Final Scores are then selected as suitable candidates. In addition, 10 more job seekers are selected as suitable candidates randomly among those with a Final Score above 50 and CV Score above 80. Suitable candidates are sent without any particular order.

ARA produces a response to the company, which contains the CVs of these 20 suitable candidates, after removing any PII (Personally Identifiable Information) from these CVs. If the company would like to receive the contact details of one or more candidates, they make a request to ARA and pay a fee of 100$/full CV requested. This time, another response is sent containing full CVs for those candidates.

Job seekers can see their Report showing each instance with its date when their CVs without PII is sent to a company, as well as when their full CVs is sent to a company, but company names are not shown to prevent job seekers contacting the company directly. Also, for both types of instances, a notification email is sent to the job seeker.

ARA keeps a log on all job seekers. If a job seeker shows no activity for 2 months, ARA sends an email and requests confirmation that the job seeker is still looking for a job. If no reply or activity is received within a month of sending this request, all information about that job seeker is removed from the system and the job seeker is notified of this removal.

**Question 1 (40 pts)**

Draw a use case diagram for ARA.

**Question 2 (30 pts)**

Draw a sequence diagram showing the happy path, i.e., a job seeker uses ARA the first time and is finally employed by a Company. Afterwards ARA removes the job seeker due to inactivity.

**Question 3 (30 pts)**

Draw a class diagram for ARA showing the following (18 pts):

Job Seeker, Company, Gold Company, Diamond Company, CV, CV without PII, Job, Payment, CV Score, Suitable candidates, Matching Score, Final Score, Report, Job Seeker Log, Response, Guidance, Job description no

In your diagram,

**b.** Include a qualified association using the qualifier in the list above (3pts).

**c.** Use at least one association class with appropriate operations and attributes (3pts).

**d.** Use the association end name in the list above (3pts).

**e.** Define appropriate operations and attributes for one of the classes (3pts).