

Job Beacon Maine

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Kalombo

Overview

What is Job Beacon Maine?

- Connects students & graduates with Maine employers
- Centralized job hub for easier searches
- Skill-based recommendations & alumni connections
- Tracks applications and job updates
- Helps close Maine's student-employer gap

Functional Requirements - Jered

Functional:

- Job match & notifications
- Application tracking
- Alumni network
- Skill gap insights

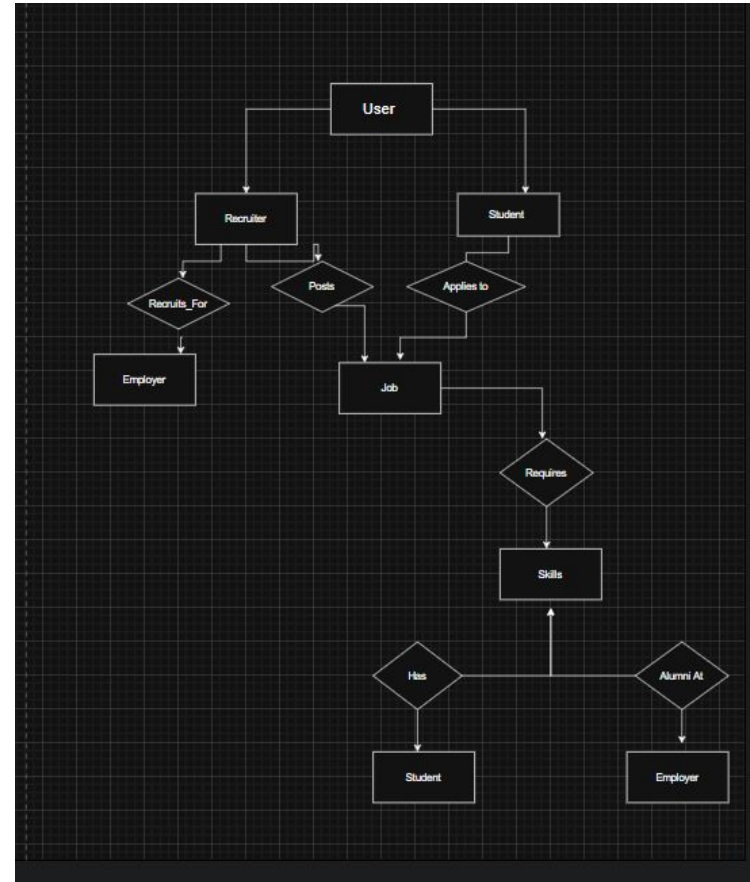
Non-Functional:

- Fast performance
- Simple interface
- Secure data
- Scalable for growth

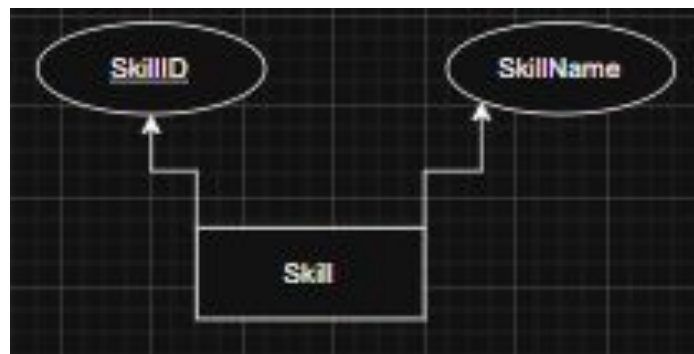
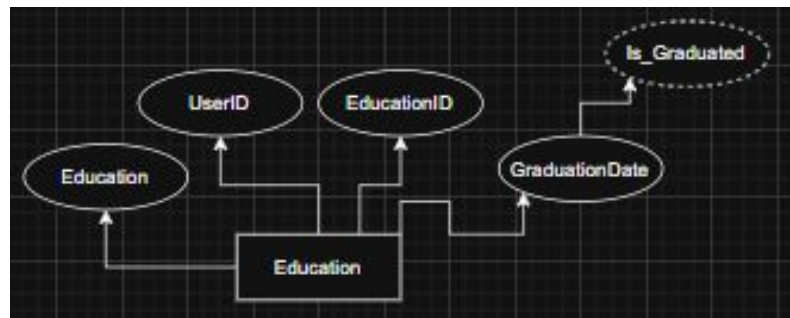
ER Diagram (*Relationships*) - Jered

- I Helped create the first draft of the ER diagram
- Focused on setting up the relationships between entities
- My partner Kadin completed it and added cardinalities & final touches

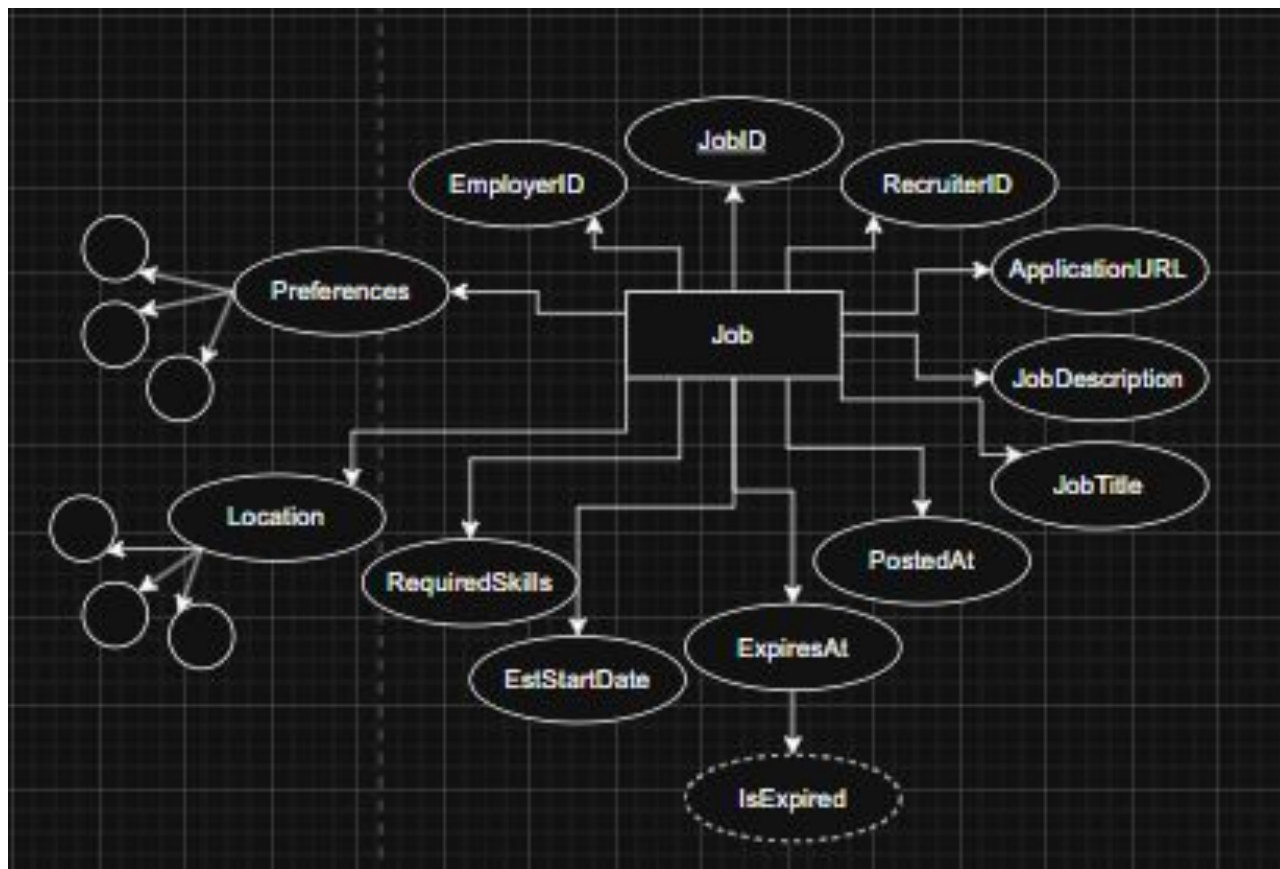
The version shown here is not the final one



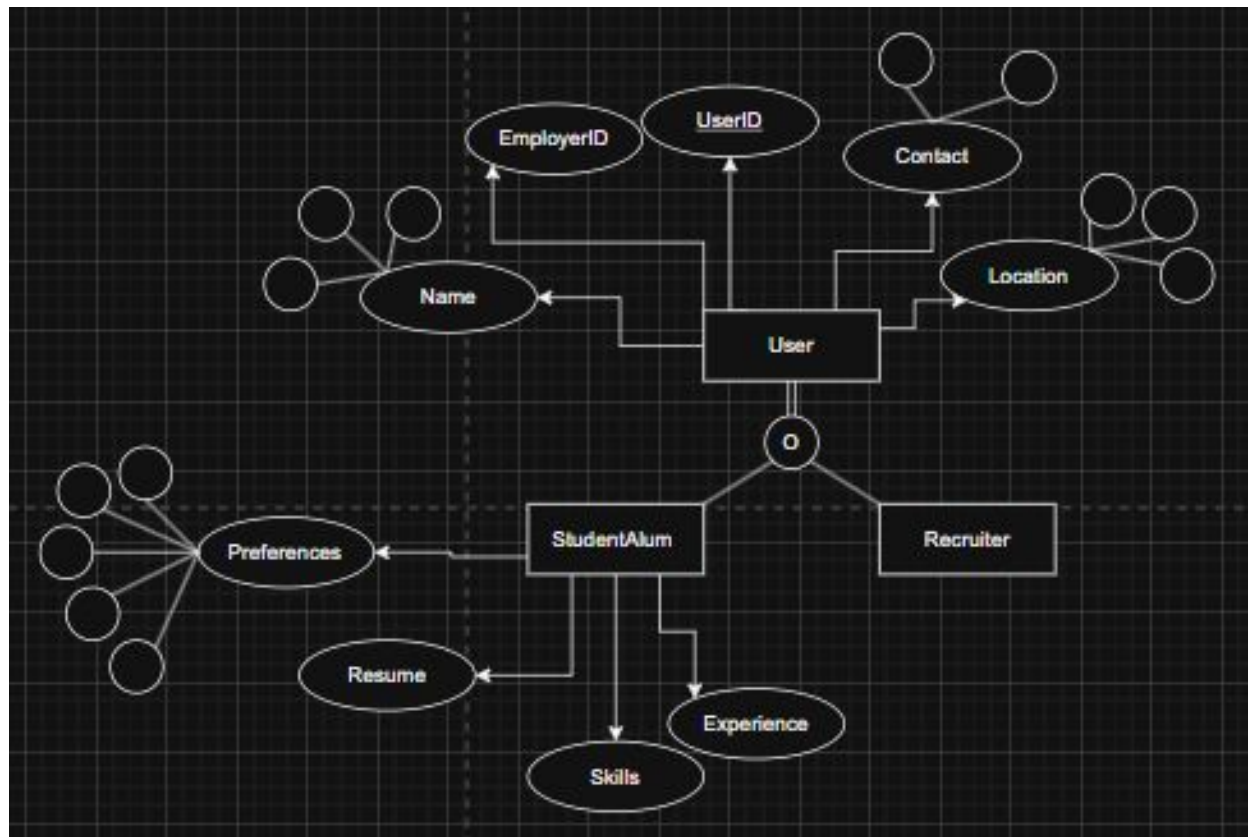
Entities: Kadin

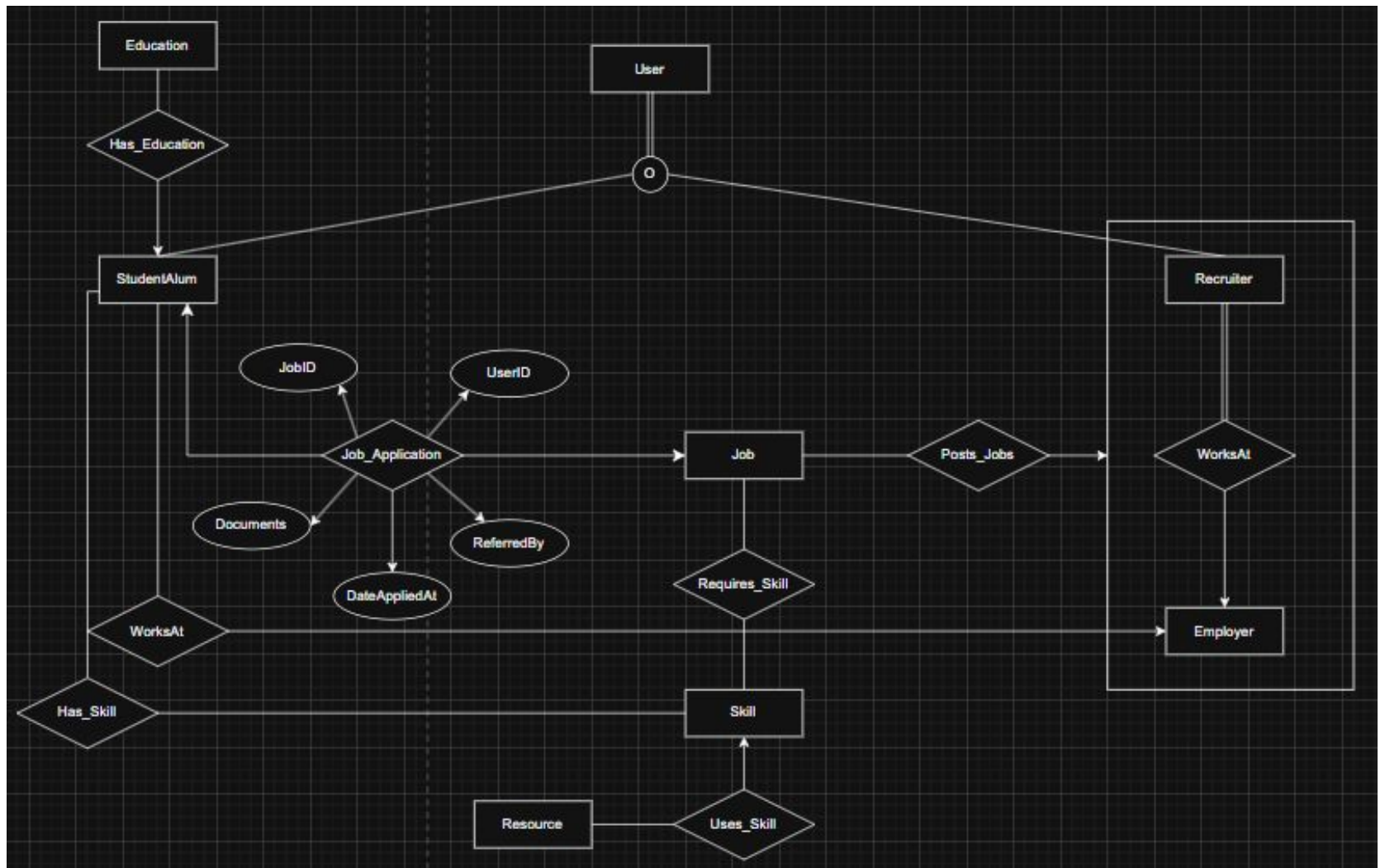


Entities: Kadin



Entities: Kadin





Key points on Entities and the ER diagram

User Entity:

The user entity has two sub entities of StudentAlum and Recruiter where the user can be on or the other or both as indicated by the overlapping notation and the double lines from user to StudentAlum and recruiter. We did this because the people using the system would fall into these categories.

Key points on Entities and the ER Diagram

In the ER diagram:

1: The recruiter works for the employer and together these entities post jobs which is why we decided to aggregate these two entities.

2: On the StudentAlum side of things, we wanted a way to connect the students applying to jobs to alum that already worked for an employer. Originally, we had an Education Attribute for the User but we then realised that this could be a multivalued attribute as a person could have more than one education. To keep the database in BCNF, Education became its own attribute related to Student Alum so there was a way to know what university the StudentAlum was from. We also added a relationship, WorksAt to link any alumni to an employer that they currently work at. Since the User entity has contact info, other users can find this information in the database.

Key points on Entities and the ER Diagram

3: The Skill entity has a relationship with Job, Resources, and StudentAlum. These relationships ensure that the applicants can show their required skills that they possess for the Job. The Resource entity is there to provide information on skills that an applicant may not have yet.

4: The JobApplication relationship. We decided to make it a relationship instead of an entity because having StudentAlum(E) submits(R) JobApplication(E) hasA(R) Job(E) seemed very messy and made more sense if the actual job application bridged the gap between the Student alum and the Job.

So basically, every time someone uses the database, they are entered as a user and based on if they are a student/alumni or recruiter, their info is stored and used to help the next users who enter into the system. This is one of the weaknesses of our design; it is only helpful if it is widely used as it needs users to populate information.

Survey & Data Dictionary - Joel

- Data Dictionary
- Google Form w/ Ellis

Entity	Attributes	Constraints / Domains
User	UserID, Name, Email (unique); PasswordHash, Role {student, employer, admin}, County, Zip; GraduationYear, Remote {none, hybrid, fully}, maxDistance, Skills	Email valid; Zip 5-digit; County ∈ Maine
Inherits(User) Student/Alumni	University, degree, graduation year, graduated	Graduated is implied from graduation year
Recruiter	EmployerID	
CompanyEmployer	CompanyEmployerID, Name, Industry, Culture, Website	Website URL
Job	JobID, Title, Description, SalaryMin, SalaryMax, City, County, Zip, Remote {none, hybrid, fully}, WorkAuthReq, PostedAt, ExpiresAt, SourceURL, CompanyID	CompanyID → Company; Zip 5-digit; SourceURL URL
Skill	SkillID, SkillName (unique), Category	SkillName unique
Required-Skill	JobID, SkillID	PK={JobID, SkillID}
User-Skill	UserID, SkillID, ProficiencyLevel	PK={UserID, SkillID}; Level ∈ {1...5}
Saved_Search	SearchID, UserID, QueryText, CountyFilter, RemoteFilter, MinSalary, CreatedAt	RemoteFilter ∈ {none, hybrid, fully}
JobApplication	JobApplicationID, UserID, JobID, Status, AppliedAt	Status ∈ {pending, interview, offer, rejected, withdrawn}
Alert_Preference	PrefID, UserID, Channel, Cadence, QuietHoursStart, QuietHoursEnd	Channel ∈ {email, sms, inapp}; Cadence ∈ {instant, daily, weekly}

Job_Beacon_Survey.csv

Joel Kalala Tshitundu October 6th at 9:38 AM

Private file

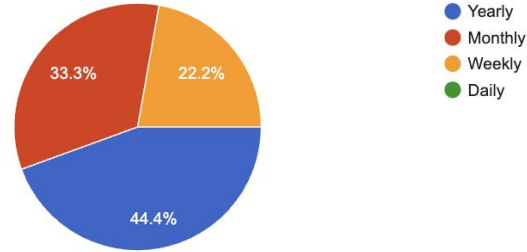


Section	Question	Type	Options
Consent	I am 18+ and agree to p...	Single choice	Yes;No
Demographics	Are you a(n)...	Single choice	Undergrad student; Gradu...
Demographics	Primary campus/affiliat...	Short answer	
Demographics	County or ZIP (Maine) -...	Short answer	
Job Search	How often do you search...	Single choice	Daily;Weekly;Monthly;Ra...
Job Search	Where do you currently ...	Checkboxes	Handshake;LinkedIn;Inde...
Needs	Top filters you actuall...	Checkboxes	County;ZIP;Remote/hybri...
Needs	How important are Maine...	Linear scale	1=Not important;5=Very ...
Skills	List 3-5 skills you hav...	Paragraph	
Skills	How helpful would a ski...	Linear scale	1=Not helpful;5=Very he...
Skills	If a job is missing 1-2...	Single choice	Yes;Maybe;No
Alerts	Preferred alert channel...	Checkboxes	Email;SMS;In-app
Alerts	Preferred alert cadence	Single choice	Instant;Daily;Weekly
Alerts	Quiet hours (start-end)...	Short answer	
Applications	Which statuses do you w...	Checkboxes	Applied;Interview;Offer...
Alumni	Would you use alumni re...	Single choice	Yes;Maybe;No
Company	Most valuable company i...	Checkboxes	Salary ranges;Culture n...
Prep	What interview prep wou...	Checkboxes	Guides/articles;Videos;...
Ranking	Rank what matters most ...	Ranking	
Feedback	What's the #1 thing mis...	Paragraph	
Contact	If you want to join a q...	Short answer	

Google Form - Ellis

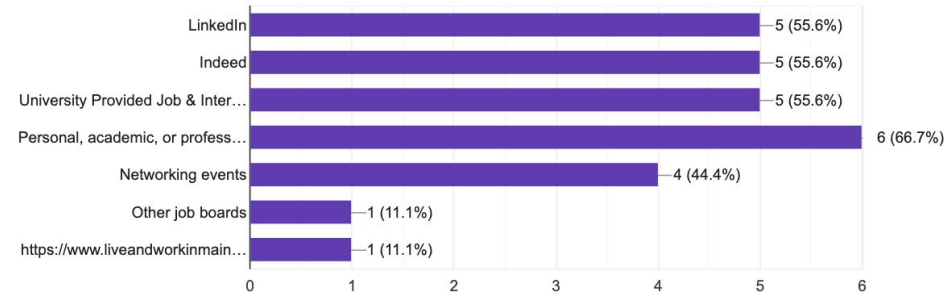
How often do you search for a job or internship?

9 responses



What do you use when you job search?

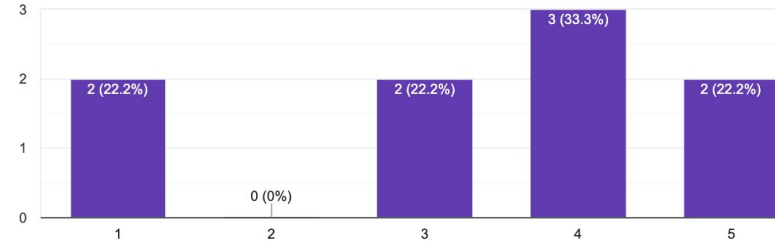
9 responses



Copy chart

How important to you are Maine-specific job filters?

9 responses



Copy chart

Data Definitions - Ellis

- Entities: USER, STUDENT_ALUM, RECRUITER, EMPLOYER, SKILL, RESOURCE, JOB
- Relationships: JOB_APPLICATION, HAS_EDUCATION, POSTS_JOB, WORKS_AT, REQUIRES_SKILL, HAS_SKILL, USES_SKILL

Entity	Attributes	Constraints / Domains
User	UserID, Name, Email (unique); PasswordHash, Role {student, employer, admin}, County, Zip; GraduationYear, Remote {none, hybrid, fully}, maxDistance, Skills	Email valid; Zip 5-digit; County ∈ Maine
Inherits(User) Student/Alumni	University, degree, graduation year, graduated	Graduated is implied from graduation year
Recruiter	EmployerID	
CompanyEmployer	CompanyEmployerID, Name, Industry, Culture, Website	Website URL
Job	JobID, Title, Description, SalaryMin, SalaryMax, City, County, Zip, Remote {none, hybrid, fully}, WorkAuthReq, PostedAt, ExpiresAt, SourceURL, CompanyID	CompanyID → Company; Zip 5-digit; SourceURL URL
Skill	SkillID, SkillName (unique), Category	SkillName unique
Required-Skill	JobID, SkillID	FK (JobID, SkillID)
User-Skill	UserID, SkillID, ProficiencyLevel	FK (UserID, SkillID); Level ∈ {1..5}
Saved_Search	SearchID, UserID, QueryText, CountyFilter, RemoteFilter, MinSalary, CreatedAt	RemoteFilter ∈ {none, hybrid, fully}
JobApplication	JobApplicationID, UserID, JobID, Status, AppliedAt	Status ∈ {pending, interview, offer, rejected, withdrawn}
Alert_Preference	PrefID, UserID, Channel, Cadence, QuietHoursStart, QuietHoursEnd	Channel ∈ {email, sms, inapp}; Cadence ∈ {instant, daily, weekly}



Domain	Constraints
Name	
RemotePolicy	{'Remote', 'Hybrid', 'Office'}
Experience	BLOB
Resource_Documents	BLOB
Pay	Int, USD
County	Counties in Maine
City	Cities in Maine
Zip	Postal codes in Maine
Email	Not null, verified email address
Phone	Valid verified phone number
URL	Valid URL
Name	String 80max String 80max Char middle
Location	City, County, Zip
Degree_Type	{'Bachelors', 'Masters', 'Doctorate'}
Education	University:string Degree:Degree_Type GraduationDate:date Graduated:derived bool

Entity Set	Attributes	Domain
USER (Total participation overlap specialization)	UserID Name Location Email Phone	Primary key Name Location Email Phone
STUDENT_ALUM (Specialization of USER)	Education MilesMaximumDistancePref RemotePref CulturePref SalaryMinPref SalaryMaxPref Experience	Education, multivalued, not null Float RemotePolicy String, multivalued Float Float Experience



Document tabs	+
Tab 1	:
Job Beacon Maine: Doma...	
Key:	
ENTITY_NAME	
RELATIONSHIP_NAME	
Entities:	
USER	
STUDENT_ALUM	
RECRUITER	
EMPLOYER	
EDUCATION	
RESOURCE	
JOB	
Relationships:	
JOB_APPLICATION	
HAS_EDUCATION	
POSTS_JOB	
WORKS_AT	

Entities:

USER	
User_ID	Primary key
Employer_ID	Foreign key, references EMPLOYER
First_Name	String, not null
Last_Name	String, not null
Middle_Initial	Char
Email	Not null, verified email address
Phone	Valid verified phone number
City	String, cities in Maine
County	String, not null, counties in Maine
Zip_Code	Int, zip-codes in Maine

STUDENT_ALUM

Total Participation Overlapping Specialization of USER

Max_Distance_Pref	Float
Remote_Pref	(Remote, Hybrid, Office)
Culture_Pref	String
Salary_Min_Pref	Float, USD, <= Salary_Max_Pref
Salary_Max_Pref	Float, USD, >= Salary_Min_Pref
Skills	String, comma separated
Experience	BLOB
Resume	BLOB

Normal Form Discussion - Ellis

- Normalization Discussion
- Once entity and relationships were final after iterating with normalization, was able to discuss how we got there.

1NF: All atomic

2NF: All attributes depend on primary key

3NF: Removed all transitive dependencies

BCNF: All functional dependencies X are superkeys