Developer Technical Screening

This is a technical screening to set a bar for candidates. We will use the results of these questions, your resume, and any additional information you send us to determine whether we think a longer conversation will be worth your time and ours.

Feel free to answer these in separate files, provide a link to a GitHub branch, or deliver the responses in whatever fashion makes the most sense to you. You should also consider including any assumptions by way of comments or a Read Me file, along with any unit tests that helped verify your solutions.

Answer each of these:

1. John Doe wants to buy a house, and needs to borrow $200,000. He receives two loan estimates from his bank, one for loan of 30 years at the rate of 3%, one for a loan of 20 years at the rate of 2.5%. Write a function that will calculate the monthly payment, generate the amortization table of the loan and then calculate how much interest will be paid over the life of the loan in both scenarios.

2. Find all of the words in a set of words that can be formed by a string provided as input. You can assume that the set of words are available as an array, in memory, and that the string will only contain alpha characters. Characters in the input string may not be used more than once, and not all characters in the input string must be used to form a word. The output of your algorithm should return an array of all words that can be formed, and if there are none, that array should be empty.

Example Input:

```
words = ["good", "bad", "dog", "cat", "do", "dont"]
input = "ddelgoo"
```

Example Output:

```
["good", "dog", "do"]
```

Please complete two of the four questions below. Your choice as to which questions to answer.

3. We have an application that crawls the internet looking at web pages and following the URLs it finds to scrape data from each page for processing later. As the amount of content on the internet has grown, the application has had trouble with scalability. In its current state, when the crawler finds a link, it enqueues that link, and eventually scrapes that page as it works through its queue. We've found that there is nothing in place to prevent the crawler from scraping a page even if it has already

visited that page. So, we need you to implement a solution that the crawler will use to traverse a page at most one time. Your solution needs to provide a method to check if a page has been visited, and another method to store a URL once it has been visited.

```
Example Input:
 [
  "https://www.google.com/search?q=best+movies+of+all+time",
"https://www.imdb.com/chart/top",
  "https://www.imdb.com/title/godfather",
  "https://www.imdb.com/title/godfather-part-2",
  "https://www.imdb.com/title/lord-of-the-rings",
  "https://www.imdb.com/title/inception",
  "https://www.facebook.com/imdb",
  "https://www.facebook.com/rottentomatoes",
  "https://www.rottentomatoes.com/top/bestofrt",
  "https://www.rottentomatoes.com/m/godfather",
  "https://www.rottentomatoes.com/m/godfather-2",
  "https://www.rottentomatoes.com/m/lord-of-the-rings",
"https://www.facebook.com/rottentomatoes",
  "https://www.facebook.com/imdb",
  "https://www.imdb.com/chart/top",
  "https://www.imdb.com/title/godfather",
  "https://www.imdb.com/title/godfather-part-2",
  "https://www.imdb.com/title/lord-of-the-rings",
  "https://www.imdb.com/title/inception",
  "https://www.facebook.com/imdb",
  "https://www.facebook.com/rottentomatoes",
  "https://www.rottentomatoes.com/top/bestofrt",
  "https://www.rottentomatoes.com/m/godfather",
  "https://www.rottentomatoes.com/m/godfather-2",
  "https://www.rottentomatoes.com/m/lord-of-the-rings" ]
```

4. Design and write a dispatching service for a small Police Station. The station has 4 teams, each with a car. The Service will receive a notification when an incoming call occurs, with each call having

a priority assigned of Low, Medium, or High. The service will also receive a notification when a team has returned from a call.

- The service should assign/dispatch a specific team for each incoming call
- If there are more calls than teams available, the calls should be queued until a team returns.
- Queued calls should be filled in priority order first, if multiple calls exist with the same priority the oldest call should be handled first.
- The team that should be dispatched is the one with the longest idle time.
- One team should always remain at the station unless a call needs handling with a priority level of High.

5. Create a webpage that has two tables. Each table should allow you to add a string which will be saved to the proper table, delete a string which will be removed from the proper table, and arrows which will allow you to move items from one table to the other. Give your webpage a centered title with the tables centered underneath.

6. (SQL) We're writing a "Current Open Tickets" report for a ticketing system that tracks tickets and their status changes in two separate tables (for auditability). Write a SQL statement using the two tables below that calculates the total amount of time each ticket spent in each available status. The result is expected to have a row for each ticket row in the Tickets table and a column for each potential status (New, In Progress, Closed, Reopened), with values for the number of minutes spent in that status. For comparison, if you run the report with the current date of '2021-01-01 12:00' (i.e., use this date as the end date for the current statuses), you should receive these results:

Id	Summary	New	In Progress	Closed	Reopened
1	My Computer wont turn	75	430	215	NULL
2	Could you print the date out in my timezone on Report XYZ?	155	67	198	148
3	Could you create a new version of the XYZ report that has 2 new columns?	362	65	NULL	NULL
4	Where is the password reset link?	223	NULL	55	NULL

```
CREATE TABLE [dbo].[StatusChanges](
    [TicketId] [int] NULL,
    [Timestamp] [datetime2](7) NULL,
```

```
    [OldStatus] [varchar](50) NULL,
    [NewStatus] [varchar](50) NULL
);

CREATE TABLE [dbo].[Tickets](
    [Id] [int] NULL,
    [Summary] [varchar](2000) NULL
);

INSERT [dbo].[StatusChanges] ([TicketId], [Timestamp], [OldStatus],
[NewStatus]) VALUES
(1, CAST(N'2021-01-01T00:00:00.0000000' AS DateTime2), NULL, N'New') ,(1,
CAST(N'2021-01-01T01:15:00.0000000' AS DateTime2), N'New', N'In Progress')
,(2, CAST(N'2021-01-01T02:32:00.0000000' AS DateTime2), NULL, N'New') ,(3,
CAST(N'2021-01-01T04:53:00.0000000' AS DateTime2), NULL, N'New') ,(2,
CAST(N'2021-01-01T05:07:00.0000000' AS DateTime2), N'New', N'In Progress')
,(2, CAST(N'2021-01-01T06:14:00.0000000' AS DateTime2), N'In Progress',
N'Closed') ,(4, CAST(N'2021-01-01T07:22:00.0000000' AS DateTime2), NULL,
N'New') ,(1, CAST(N'2021-01-01T08:25:00.0000000' AS DateTime2), N'In
Progress', N'Closed') ,(2, CAST(N'2021-01-01T09:32:00.0000000' AS DateTime2),
N'Closed', N'Reopened') ,(3, CAST(N'2021-01-01T10:55:00.0000000' AS
DateTime2), N'New', N'In Progress') ,(4, CAST(N'2021-01-01T11:05:00.0000000'
AS DateTime2), N'New', N'Closed');

INSERT [dbo].[Tickets] ([Id], [Summary])
VALUES
(1, N'My Computer wont turn')
,(2, N'Could you print the date out in my timezone on Report XYZ?') ,(3, N'Could
you create a new version of the XYZ report that has 2 new columns?') ,(4,
N'Where is the password reset link?');
```