Digital Problem-Solving Exercise

What it is

The Digital Problem-Solving Exercise is an online assessment that measures key aspects of data-based problem solving and critical thinking skills. You'll be given a dataset based on a fictional scenario and asked to:

- Identify relevant variables based on the questions
- Complete a series of tasks using the dataset provided

The exercise is designed to (1) measure key capabilities required for success in this role and (2) give you an opportunity to learn about and complete activities similar to what could be asked of you as a Capital One Business Analyst.

Why it is included

Business Analyst teams at Capital One work with data every day - you'll be asked to understand, interpret, and leverage relevant data to make the best decisions that help solve important business problems. We're excited to see how you use data-based problem solving and critical thinking to tackle challenges and find smart solutions!

Ready to practice?

Now that you've learned more about the Digital Problem-Solving Exercise, what exactly are we looking for? As a data-driven organization, we want to make sure you have a certain level of fluency with numerical reasoning and problem solving using data.

You'll explore data and perform calculations in a spreadsheet interface within the Code Signal assessment platform. We partner with CodeSignal (external vendor) to host and administer the assessment. Please complete the exercise on your own - it should reflect your individual effort. **The use of Generative AI tools (e.g., ChatGPT, Gemini) is strictly prohibited.**

While brushing up on your skills to prepare for this exercise, some great places to start are practicing break-even equations and weighted averages. You should also get comfortable with creating basic bar charts or line graphs in environments similar to Excel / Google Sheets and interpreting data patterns.

We've included a few sample questions, so you can get a feel for the exercise!

Sample Questions

- You are a scientist with 2 robots that are used for desert exploration.
- Each robot consumes energy to operate and contains a battery. Robot A is equipped with a solar panel, which generates energy when traveling.
- Based on the data and information given, you have to make various decisions for your robots.

Question 1

Robot A gains 6 energy units for every 10 miles it travels, and it uses a fixed 60 energy units to activate. It also consumes 2 energy units per 10 miles to power sensors.

With Robot A currently at zero net energy, what is the minimum distance (in miles) Robot A has to travel to break even in terms of energy (i.e., energy units gained = energy units used)?

Solution

Let x represents the number of 10-mile segments that Robot A travels:

Energy units gained = 6x
Energy units used = 60 + 2x
x = 15

Since each segment is 10 miles, Robot A has to travel 15 x 10 = **150 miles**.

Sample Questions (Continued)

Question 2

To determine if a robot needs to return to the lab for repairs, you monitor the battery health score. It is based on three factors:

- Charge level (50% weight)
- Voltage stability (30% weight)
- Cycle efficiency (20% weight)

Each factor is scored out of 100. Robots with a battery health score below 70 need to be recalled. Based on the data below, which robot(s) should be sent back to your lab?

Robot A Status	Robot B Status
• Charge level - 73 • Voltage stability - 60 • Cycle efficiency - 65	• Charge level - 65 • Voltage stability - 80 • Cycle efficiency - 75

Solution

Robot A	Robot B
Battery health score = (73 x 0.5) + (60 x 0.3) + (65 x 0.2) = **67.5**	Battery health score = (65 x 0.5) + (80 x 0.3) + (75 x 0.2) = **71.5**

Therefore, only Robot A needs to return to your lab.

Sample Questions (Continued)

Question 3

You're studying how various factors can impact robot communication signal strength during desert exploration. You've completed 12 test runs under different conditions with both robots. Terrain roughness is rated on a scale from 1 (smooth) to 4 (rough), and communication signal strength is rated on a scale from 0 (weak) to 100 (strong).

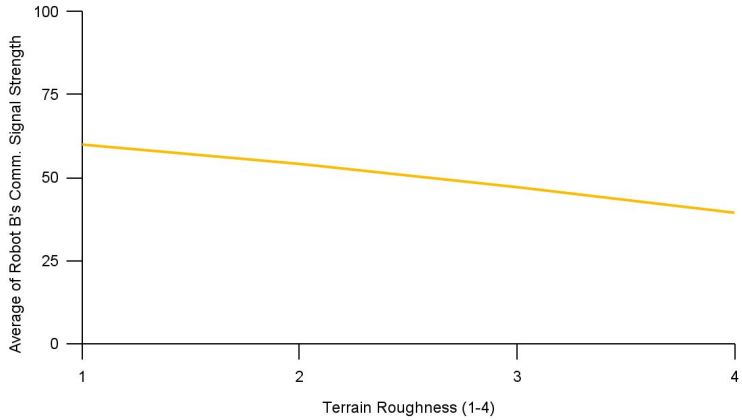
Test #	Terrain Roughness	Robot A Communication Signal	Robot B Communication Signal
1	2	89	53
2	3	76	49
3	4	66	42
4	3	74	44
5	2	84	55
6	1	91	57
7	2	83	55
8	1	92	62
9	1	95	61
10	4	69	41
11	4	64	35
12	3	75	48

Understanding communication signal strength will be important for an upcoming mission scheduled for Robot B in unpredictable desert terrain. Based on the data, describe the relationship between terrain roughness and communication signal strength for Robot B.

Solution

To answer this question, you will focus on inspecting the ratings for Robot B only.

You can then create a graph to illustrate the pattern after calculating the average robot communication signal strengths for Robot B by terrain roughness ratings.



As shown in the graph, it's a negative, linear relationship - **as terrain roughness increases, Robot B's communication signal strength decreases.**

After Submission

Within 5-7 business days of completing your exercise, you'll be notified of your status. Please look out for an email regarding next steps.

Proctoring FAQ

How does proctoring work for the exercise?

You'll be prompted to share your camera, microphone, and screen for the duration of the testing session in CodeSignal. This data will be recorded and reviewed by someone on the CodeSignal proctoring verification team. In order for your assessment results to be verified, you must abide by testing rules.

What are the testing rules?

You will need to comply with the testing rules, which will be displayed prior to beginning the testing session:

- Video is required
- Display is required
- Must be alone in the room
- Connected to a power source
- Do not wear headphones
- Use a single monitor or screen
- Must be completed in a single session without breaks or leaving work station
- Entire face is visible and well-lit throughout the session
- Do not use Gen AI tools
- Do not use other devices, including phones or tablets
- Do not screenshot, print, download any part of the test
- Scratch paper is allowed
- Web searches are allowed for references only, such as excel/math formulas, functions, syntaxes or other supplemental information
- Web searches of question answers directly will result in disqualification .

What are the technical requirements for proctoring?

Make sure you have the following for the testing session:

- A room where you won't be disturbed and no one will enter the camera frame while you're testing
- A strong internet connection (download/upload speed of at least 500 Kb/s)
- The latest version of Chrome, Firefox or Edge
- A computer (not a mobile device) with a camera, microphone and screen-sharing capabilities

How is the proctoring data used?

CodeSignal uses proctoring data to ensure you've observed the evaluation rules for the testing session. Proctoring data is reviewed by CodeSignal only and stored and deleted within 15 days.