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**Game Intelligence**

**Data Analyst Assessment**

**Instructions**

* You have 24H from the time of cloning/downloading this repository to submit your solutions and workings.
* Please save your solutions and workings within the local repository of this assessment that you have cloned and use it to create your own github repo (which you can then share with us), or zip the repo folder which includes your solutions and workings and email it to us.
* If you prefer writing on paper when solving the Probability and Logic section, you may take pictures of the solution and workings and include them in the repo. Please name the files appropriately.

*Note – candidate need not prepare a formal presentation in the allowed time. Ability to compile a presentation is not being examined. It will suffice to present your workings, thoughts and analysis in their original form*

**Probability and Logic**

1. You are shut in a prison cell and asked by the guard to tell him when exactly 7 and a half minutes have passed. If you are correct, you will be set free, wrong, and you will be imprisoned for eternity. You have two pieces of string and a lighter. You are promised that by lighting one end of either string, it will take 10 minutes to burn to the other end, however the strings do not burn at a uniform rate (some subsections take longer than others). Can you set yourself free? How? (Assuming the time it takes to light a string is negligible)

**Recommended time: 0.5 hours**

**Pre-requisites:**

* I tried to answer these questions (particularly the first half of the test) as concisely as possible however had to cater for the element of ambiguity and hypothetical questions hence had to ensure my basis was covered as thoroughly as possible.
* As a corollary to the abovementioned point, I had the proclivity to:
* Firstly, **provide the obvious answer** which the masses of people would have initially opted for,
* Secondly, I provided a **response predicated on logic** and the hypothetical variables which could not be ignored,
* Thirdly, I provided a **pragmatic solution** ie. That which is not only predicated purely on theoretical knowledge but something which is easily implementable & practical.

Link:

<https://www.practiceaptitudetests.com/resources/how-to-answer-logical-reasoning-tests/>

The above-mentioned link assisted me in understanding the type of logic question this is (more along the lines of Critical Reasoning type logic question).

**Response:**

**Obvious Answer:**

1. Fold the string in 1/2 (gives us two equal parts)
2. Fold each ½ into ½ again (gives us four equal parts)
3. Use the ¾ segment line as our indicator of 75% of the string (7.5 minutes of 10 minutes)
4. As we see it burn to the indicator mark we got from folding it into the ¾ segment, then we can call out the 7.5 minute mark.

**Response predicated on logic alone:**

1. Firstly, if I were in a prison cell (hypothetically), I would certainly not be allowed in with two pieces of string and especially a lighter.
2. The material of the string is not specified such as cotton, guts, Velcro etc. hence the material is not stated to answer this question effectively.
3. The dimension of the string also makes a difference.
4. Are the strings the same length? Not explicitly stated that they are equal length.
5. If it is a hypothetical situation and we are allowed in a prison cell with strings and a lighter, then we may be allowed with a wristwatch which we can use to precisely call out the 7.5-minute mark or look at the wall clock displayed outside the cell.

Final response, from a logic approach alone, this cannot be answered effectively with the ambiguity in the question, and perhaps if that is overlooked, I would not be able to precisely indicate the 7.5-minute mark. So, I will be jailed for eternity.

**Pragmatic response:**

1. Fold the string in ½.
2. Fold each ½ into another ½ (gives us 4 equal pieces)
3. Measure ¾ and use the lighter to make a slight burn mark onto the ¾ mark of a string.
4. When you light the one end and start to burn it, then you can call out the 7.5-minute mark to the guard.
5. You can then be released for pointing that out accurately.

\*\*\*End of Q1\*\*\*

1. You’ve completely mixed up your exam dates, and suddenly realize that your math exam is tomorrow. You haven’t yet started studying. It is now 6:00 PM and your exam is at 10:00 AM. You determine that you have enough time between now and the exam, to cover 100% of the course material, with exactly one hour to spare. If you decide to sleep for any number of hours, any course material not covered as a result will mean you cannot answer that proportion of marks in the exam. For the proportion of material that you have covered, your scoring rate in the exam is dependent on the quality of your sleep. Your maximum scoring rate is achieved at 8 hours of sleep – 87% of material answered will be correct. Sleeping more than 8 hours does not increase the scoring rate and studying beyond 100% of course coverage also does not provide any benefit. For every hour of sleep less than 8 hours, your scoring rate depreciates by 7.9% of the previous scoring rate, ie. at 7 hours, your scoring rate is 87% less 7.9% of 87% = roughly 80.13%. At 6 hours it is then 80.13% less 7.9% of 80.13%, and so on.
2. Assuming you always follow a perfectly uniform rate of study, and that the exam is perfectly balanced in terms of course material (ie. you can study for, and answer for any arbitrary fractional percent of the entire paper, example 74.3578%), are you able to pass the exam if the pass mark is 50%? How many hours should you study for to achieve the maximum amount of marks (you may study to any arbitrary fraction of an hour).
3. On your way to the exam hall you meet a classmate that you’ve never noticed before. She is shy and very soft-spoken. You wonder if she belongs to the pure math stream that is taking this course, or the business science stream (the only other stream taking the course). You make a judgement based on past experience that a student in the math stream is 8 times as likely as a business stream student, to be shy or conservative. At the start of the semester, you recall paging through the class list. There were 349 business science majors, and 29 math majors. What is the likelihood that this girl is a math major?

**Recommended time: 1.5 hours**

Workings for part a can be found below:

Table

Description automatically generated

Calculated with formula’s

Response:  
If I study for hours of 1-7 then I still have 8 hours of sleep with a higher scoring rate of 87%. However, the mark I achieve in the exam is still less than the required 50% to pass. So I will still fail the exam.

However, the highest mark I can achieve is if I have 2 hours of sleep with a study rate of 93.3333333333333% and scoring rate of 48.903% leaving me with an exam mark of 45.6428%.

Either way I will fail the exam but the highest mark I can achieve is indicated above. This Is very hypothetical ofcourse, so does not really work like that in the real world. Although it is not advised but some individuals grasp concepts better under immense pressure, others have a higher tolerance for cherry-picking content to prepare for and some make informed guesses and elimination on sections to study.

Working for part b can be found below

349 business sc majors ; 29 maths majors = 378 in total  
  
349 : 29  
349/378 : 29/378  
0.92328 \* 100% : 0.07672 \* 100%  
92.32804% : 7.671958%

It is **7.671958%** that the girl is a maths major

**Data Analysis**

The video game industry has been one of the fastest growing markets in recent years. Creators of video game titles (known as software providers), market their games to gamers, the consumer base, who then purchase the games to own and play. Games are sold specific to the platform on which it was developed for. A game purchased for Playstation for instance, cannot be played on Xbox. It is quite common for the same game to be developed for multiple platforms, as it makes business sense to appeal to the largest consumer base possible.

**OverboardTM** is a gaming software provider with a focus on lightweight titles that can be played across mobile devices such as cellphones and tablets. They have a portfolio of over 45 games, the first of which was released in the second half of 2011. Due to varying regulatory requirements across the 4 different platforms on which their games are launched, the company has had to deploy different business models to suit the needs of each one. On mobile platforms, it is well understood that expensive titles, often create a wall that blocks out potential players, as the monetary commitment up front is too high. Therefore, the business model employed is one in which the games are provided as free to play up front, but have in-game items (that give players advantages) which cost money to purchase. These are known as microtransactions. On the non-mobile platforms, there are strict regulations around microtransactions, and thus the business model is simplified in which there is an upfront cost to purchase the game, but no purchases thereafter.

Last year (2017) the company released 12 titles across a variety of themes and platforms. The company employed a new strategy for mobile games released after 1 August. This strategy involved providing free ‘loot boxes’ to players on a weekly basis, which contained random items that could be purchased normally in-game. The free loot boxes were limited to 1 per week, but additional loot boxes could be purchased by players. Details aside, the exec of marketing has come to you to find out whether this strategy has had positive effects, which could range from better player engagement, players spending more in game, or the game attracting more players. The mobile platforms across which titles are deployed are iOS and Android, however due to regulations on the Apple app store for iOS, which banned loot boxes, the company was only able to deploy this strategy to Android.

You are provided with aggregated performance data for all 12 titles released in 2017, for the first 2 weeks (14 days) since each games’ launch. Uncover any effects, positive or negative, from the new loot box strategy. You are encouraged to use any statistical and/or analytical techniques to back up your answer. Please refer to the “columns.txt” file for a description of the provided csv data files.

**Recommended time: 3.5 hours**

**(You will be required to present your answer to us, however you should also be prepared to explain results as if it were a non-technical audience. We are looking only for a logical expression of your findings, so you should not spend time on fancy power point presentations, or pretty report documents.)**

**Response:**

**Breaking down the requirements:**

-Since we are measuring the effect (positive or negative) of the new strategy we must consider the platform it is hosted on.

-It was available on mobile platforms (iOS and Android) however iOS cannot host it due to regulations hence only exclusive to Android.

-Then it is important to note that we can only quantify it from the date it was implemented hence stated after 01 August in the year 2017, so from the 02 August 2017 essentially.

-Going forward the Game Keys in question that meet these criteria mentioned above are:

Graphical user interface, application, table

Description automatically generated

-This response will use Microsoft Excel (For Data Analysis – Pivot Tables & running functions), however will also provide an hypothetical way in which the results can be achieved using Oracle PL/SQL (SQL Developer).

-The assumption on the latter is based on the each .csv file loaded as a database table within an Oracle Schema either via Oracle Enterprise Manager or Cmd syntaxes – since there are permissions limitations, I could have these files loaded into a test schema (hence the assumption for Oracle scenario).

**Using Excel (for Data Analysis – Pivot Tables):**

1. Looking at the data to answer the questions we have to firstly filter the data
2. Since the loot box strategy was implemented into the mobile environment ie. iOS and Android firstly those two environments can be filtered to – specifically Platform Key 1 and 2.
3. Then since iOS banned this loot box strategy filter can be revised to only Platform Key 2 – Android devices.
4. Since the strategy was only implemented after 01 August 2017 a date filter can be done on after 01 August 2017 ie. Form 02 onwards.
5. All the Game\_IDs that apply are **310, 311, 312, 313, 314**.

**Player Engagement (Excel)**

**Total game player seconds (not across all overboard games)**

Table

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This was gathered using pivot tables to filter out data from the dataset, using the criteria mentioned at the beginning and displaying only the **Sum of Game Player Seconds** for the **Game\_IDs 310, 311, 312, 313 and 314**.

Graphical user interface, text, application, table

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Answer: 311 had the highest game player seconds than the other Game\_IDs 310-314 on the mobile android system which has the Lootbox package.

On the **iOS** package the highest Game\_ID was **305** (5732594.79)  
On **Android** the highest Game\_ID was **311** (2861427.3)  
On **Steam** (valve) the highest Game\_ID was **305** (4155125.82)  
On **Playstation** the highest Game\_ID was **305** (1143236.16)

So on all platforms besides the Android platform Game 305 had the most Game Player Seconds. The difference can be attributed to the loot boxes being implemented on Android platform which then had Game\_ID 311 represent the highest Game Player Seconds. Although correlation does not necessarily imply causation, a considerable case can be made when the seconds played per game, is seen in instances where the loot box strategy was implemented. It certainly deviated from the norm and other results without the strategy hence had a significantly profound impact on the time sent on the game.

Game unique accounts = highest was 311 (48890) and 314 (45682) ; lowest was 307 (21087) & 310 (20536).

**Response Using PL/SQL (Oracle SQL Developer):**\*AT = Attribute Table  
 SP = Spatial Table

1. **Understanding the highest count of unique accounts logged in per game**Select count (Game\_Unique\_Accounts)   
   from AT\_Fact\_Day  
   where Platform\_Key = 2  
   order by Game\_Unique\_Accounts ASC;

**NB: My sincere apologies for the frantic jumping around in this last section, due to time constraints with my day job and training which I am conducting could not comprehensively conduct the data analysis bit to the best of my ability.**

**If I had more time would have imported the csv files into database tables within the oracle schema and ran SQL statements to query out data and make inferences based on the data.**

**I would like to kindly ask that this metric of measurement/competency not be taken as a comprehensive depiction of my skills and I would relish the opportunity to speak with you in the form of a formal interview or conversation about my thought process and competencies.**

**Sincere Regards,**

**Davendren Govender**