

ASSIGNMENT COVER SHEET

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CANDIDATES MUST KEEP A COPY OF THEIR ASSIGNMENT**

Candidate to complete the following section (and update details in header):

Member ID:	<Sample Assignment>
Subject:	<div><input type="checkbox"/> Asset Liability Management</div> <div><input type="checkbox"/> Communication, Modelling and Professionalism</div> <div><input type="checkbox"/> Banking</div> <div><input type="checkbox"/> Enterprise Risk Management</div> <div><input type="checkbox"/> General Insurance and Health Pricing and Portfolio Analytics</div> <div><input type="checkbox"/> General Insurance and Health Valuation</div> <div><input type="checkbox"/> Investment</div> <div><input type="checkbox"/> Life Insurance and Retirement Product Development</div> <div><input type="checkbox"/> Life Insurance and Retirement Valuation</div> <div><input checked="" type="checkbox"/> Data Science Applications</div> <div><input type="checkbox"/> General Insurance Applications</div> <div><input type="checkbox"/> Life Insurance Applications</div> <div><input type="checkbox"/> Superannuation and Retirement Applications</div>
Due Date:	[Monday, XX Month 2024 at 12:00pm AEST]

PLAGIARISM

By submitting your assignment, you are implicitly stating that the work is your own.

Remember that an important aspect of being a professional actuary is to always act with integrity. Committing plagiarism by copying another person's work or not properly referencing other sources used in your assignment is a breach of the Integrity principle under the Actuaries Institute's Code of Conduct.

Any suspected plagiarism will be referred to the Institute's Executive General Manager, Education for review. Depending on findings, a complaint regarding the member may be made to the Institute's Conduct Committee. Subject marks may not be released until the matter is resolved.

Be aware that your assignment may be vetted using Turnitin.

Question 2a.

The first line of each of the 10 transcripts is provided in the Appendix.

Me:

1. Context / Instruction

You are analyzing **customer service call transcripts** from **Bigtel**, an Australian mobile network retailer.

Each transcript represents a **single customer call**.

Bigtel's management wants to identify the following for each transcript:

- **Sentiment**
- **Reason for the call**
- **Repeat call status**
- **Estimated Net Promoter Score (NPS)**

1.1. Purpose

The goal is to generate a **structured summary** of each transcript. Specifically:

- **Sentiment Score:** A float between **-1 (very negative)** and **+1 (very positive)**
- **Reason Category:** One of the following:
 - Technical support (including setup issues)
 - Change subscription plan
 - Billing
 - Other
- **Repeat Call:** A boolean: true if it's a repeat call for the same issue, otherwise false
- **Net Promoter Score (NPS):** An integer from **0 (unlikely to recommend)** to **10 (highly likely to recommend)**

1.2. Details

- Each transcript is a **conversation between a customer and a customer service agent**.
- **No external context** should be used—only rely on the content of the transcript.
- If something is **ambiguous**, make your **best reasonable guess**.
- The **NPS** should be inferred from the customer's experience and sentiment.
 - Dissatisfaction → lower NPS
 - Satisfaction → higher NPS

2. Input Data

2.1. Example

- You will receive **call transcripts** in a **Word document**.

2.2. References

- **No external references or knowledge bases** should be used.

- **Only the transcript** content should inform your responses.

3. Questions or Commands

3.1. Direct Question

"What is the sentiment, reason, repeat-call status, and NPS for this transcript?"

You should:

- Provide reasoning for each of your selections.

3.2. Action Command

For each transcript, produce the following JSON output:

json

CopyEdit

```
{
  "sentiment_score": <float from -1 to 1>,
  "reason_category": "<Technical support|Change subscription plan|Billing|Other>",
  "repeat_call": <true|false>,
  "net_promoter_score": <integer from 0 to 10>
}
```

4. Output Requirements

- 4.1. **Format:** A single JSON object containing the consolidated results of all transcripts
- 4.2. **Length:** Keep the JSON output **concise**

5. Constraints / Limitations

5.1. Boundaries

- Output Constraint
 - Sentiment: A float value ranging from -1 (very negative) to 1 (very positive). Use a negative value to reflect negative sentiment, and a positive value to reflect positive sentiment.
 - Reason Category: Must be one of the following: Technical support, Change subscription plan, Billing, or Other.
 - Repeat Call Status: A boolean value indicating whether the call is a repeat for the same issue (true or false).
 - Estimated Net Promoter Score (NPS): An integer between 0 (not at all likely to recommend) and 10 (extremely likely to recommend).
- **Use only** the transcript content to make inferences
- **Do not invent facts**
- **Focus only** on the four required fields
- **Do not add metadata** or disclaimers to the JSON
- **No commentary**—just the keys and values

5.2. Specific Instructions

For each of the **ten transcripts**:

1. Read the conversation text
 2. **Do not use coding tools**
 3. Determine the following:
 - Sentiment
 - Reason category
 - Repeat call status
 - Estimated NPS
 4. Consider the **reason for each selection**
 5. At the end, concatenate all your JSON outputs into a single block and only output JSON.
 6. Output only the JSON—do not include any introductory phrases such as "Here is the structured JSON output."
-

GPT 4o Output:

```
[
  {
    "sentiment_score": 0.8,
    "reason_category": "Technical support",
    "repeat_call": false,
    "net_promoter_score": 9
  },
  {
    "sentiment_score": 0.7,
    "reason_category": "Technical support",
    "repeat_call": false,
    "net_promoter_score": 8
  },
  {
    "sentiment_score": 0.6,
    "reason_category": "Change subscription plan",
    "repeat_call": false,
    "net_promoter_score": 7
  },
  {
    "sentiment_score": -0.3,
    "reason_category": "Billing",
    "repeat_call": false,
```

```
    "net_promoter_score": 4
  },
  {
    "sentiment_score": -0.6,
    "reason_category": "Billing",
    "repeat_call": false,
    "net_promoter_score": 3
  },
  {
    "sentiment_score": -0.5,
    "reason_category": "Billing",
    "repeat_call": false,
    "net_promoter_score": 4
  },
  {
    "sentiment_score": -0.4,
    "reason_category": "Billing",
    "repeat_call": false,
    "net_promoter_score": 5
  },
  {
    "sentiment_score": -0.2,
    "reason_category": "Billing",
    "repeat_call": false,
    "net_promoter_score": 6
  },
  {
    "sentiment_score": 0.3,
    "reason_category": "Billing",
    "repeat_call": false,
    "net_promoter_score": 7
  },
  {
    "sentiment_score": -0.6,
    "reason_category": "Billing",
    "repeat_call": true,
    "net_promoter_score": 2
  }
]
```

Question 2b.

Summary of LLM Prompt Results and Management Implications

The LLM analysis of ten customer call transcripts reveals clear patterns across three key management issues: **billing system failures**, **call centre cost concerns**, and **customer churn**.

1. Subscription Pricing Issues (Bug-Ridden Billing System)

- Seven out of ten calls (70%) were **billing-related**, with all but one exhibiting consistently negative sentiment scores ranging from -0.6 to -0.2.
- The **Net Promoter Scores (NPS)** for these billing calls were **low (2–6)**, with the lowest (2) belonging to a **repeat caller**, suggesting unresolved billing issues are frustrating customers.
- The only billing-related call with a positive sentiment (0.3) still had an NPS of 7, indicating **room for improvement** even in the best billing experiences.
- **Notes:** While billing dominates the call reasons in the JSON output, it is **not yet clear from JSON whether these issues are due to system errors or other causes**. Further **clustering and manual validation** are needed to confirm root drivers.

Insight: Billing concerns are a major pain point, contributing to customer dissatisfaction and posing a clear **churn risk**.

Action: Prioritise fixes to the pricing system. Automate error detection and offer proactive credits to prevent repeat calls and retain goodwill.

2. Call Centre Cost Efficiency

- Only **1 out of 10 calls was a repeat**, which indicates that **most issues were resolved on the first attempt**. This is a positive sign for efficiency.
- However, the high proportion of **negative sentiment billing calls** may still lead to **longer handling times**, even if they don't repeat.
- **Technical support calls (2 calls)** had **very positive sentiment (0.7 and 0.8)** and **high NPS (8 and 9)** — these are effective and create brand promoters.

Insight: The call centre is resolving most issues efficiently, especially for technical support, but **billing-related interactions likely consume excessive time** due to complex explanations.

Action: Train agents to handle billing disputes faster using templates and structured responses. Invest in **digital self-resolution tools** for billing issues.

3. Churn Risk and NPS Signals

- **Average NPS for billing calls is 4.4** versus **8.0 for non-billing calls**, Average sentiment for billing calls is -0.3 versus 0.7 for non-billing. These suggests that **billing concerns strongly correlate with churn drivers**.

- All **technical and plan-change calls were single-touch and positive**, with no churn indicators.
- The **repeat billing call** with the lowest NPS confirms that **unresolved billing issues** are likely churn triggers.

Insight: Negative sentiment and low NPS on billing calls correlate with churn risks.

Action: Use transcript sentiment and NPS as early warning signals to **trigger churn-prevention workflows**, such as targeted retention offers.

Overall Recommendation

To address all three management concerns:

- **Fix billing system bugs** to eliminate a driver of customer dissatisfaction.
- **Streamline billing dispute resolution** to lower call volumes and reduce handling time.
- **Leverage sentiment and NPS analytics proactively** to identify and retain at-risk customers before they churn.

These insights are grounded in real customer interactions and offer clear, targeted actions for improvement.

(473 words)

Appendix: First Line of the 10 Transcripts

- Transcript 1:
"Bigtel Customer Service: Welcome to BigTel customer service center. This is John speaking. How may I assist you today?"
- Transcript 2:
"Bigtel Operator (BO): Thank you for calling Bigtel, this is Alex. How may I help you today?"
- Transcript 3:
"Customer Service (CS): Thank you for calling Bigtel, this is Sarah. How may I assist you today?"
- Transcript 4:
"Operator: Hello, thank you for calling Bigtel customer service. My name is Emily. How may I assist you today?"
- Transcript 5:
"Customer Service Rep: Hello, thank you for calling Bigtel. My name is Sam. How may I assist you today?"
- Transcript 6:
"Customer Service Operator (CSO): Good day, thank you for calling Bigtel Customer Service, my name is Mark. How can I assist you today?"
- Transcript 7:
"Bigtel Customer Service (BCS): Good day! Thank you for calling Bigtel Customer Service, how can I assist you today?"
- Transcript 8:
"Operator: Thank you for calling Bigtel customer service, my name is James, how may I assist you today?"
- Transcript 9:
"Call Center Operator(CCO): Hi, you have dialed Bigtel's customer service hotline. My name is Mike. How can I assist you today?"
- Transcript 10:
"Operator: Welcome to Bigtel customer service, how can I assist you today?"