

# HOW TO WRITE A RESEARCH PAPER

# GROUP MEMBERS

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# BACKGROUND

- It identifies and describes history.
- Background explains nature of well-defined research problem.
- It should indicate the root of problem.

# WHY BACKGROUND IS IMPORTANT

- It promotes confidence in analysis and findings.
- Provides the reader with essential context.
- It contains summary of important, relevant research studies.

# DIFFERENCE B/W INTRODUCTION WITH BACKGROUND

- Introduction contains preliminary data about topic.
- Background of your study discusses in depth about the topic, whereas the introduction only gives an overview.
- Introduction should end with your research questions, aims, and objectives, whereas your background should not.

# OVERVIEW OF RESEARCH PAPER

- Abstract
- Introduction
- Method
- Results
- Discussion
- Conclusion
- References

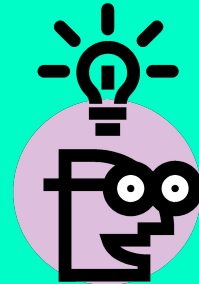
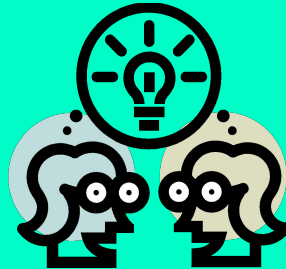
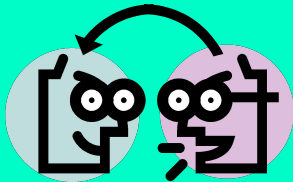


MAKE A GOOD FIRST IMPRESSION WITH YOUR TITLE AND  
ABSTRACT



# RESEARCH PAPER TITLE

**The Best Representation of paper : Contributions and Unique features (At most 15 words)**





# SIGNIFICANCE OF A TITLE

- ❑ The first thing that readers usually notice about a paper is the title.
- ❑ A title should be engaging, catchy, and interesting; otherwise, readers may not be encouraged to continue reading

# EFFECTIVE TITLE :

**Identify Main issue**

**Begin With Subject**

**Accurate, Unambiguous, Specific**

**Attract Readers**

# TOPIC DECISION :

- Read literature and understand central ideas in your field
- Get advice from experts
- Library/internet
- Conferences/seminars
- Improvise your ideas
- Draw inspiration from anywhere you can

# **Writing a Research Abstract**

# WHAT IS AN ABSTRACT?

Brief summary of :

- Research article
- Thesis
- Conference proceeding



# PURPOSE OF AN ABSTRACT?

To help the reader quickly ascertain  
the paper's purpose

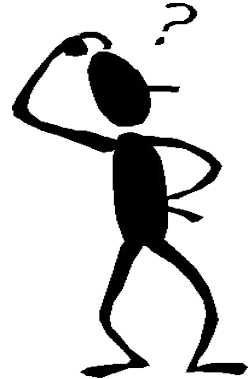
# ABSTRACT SHOULD FOCUS ON :

- Aim and scope of the study.
- key Problem to be addressed and theory
- Method used
- The data set
- Key Findings
- Limitations



# WHAT DOES A GOOD ABSTRACT DO?

- Sparks interest in your research paper.
- Provides a concise description of your research paper .
- States in a clear and simple way the main points of your paper.
- Targets your specific audience .

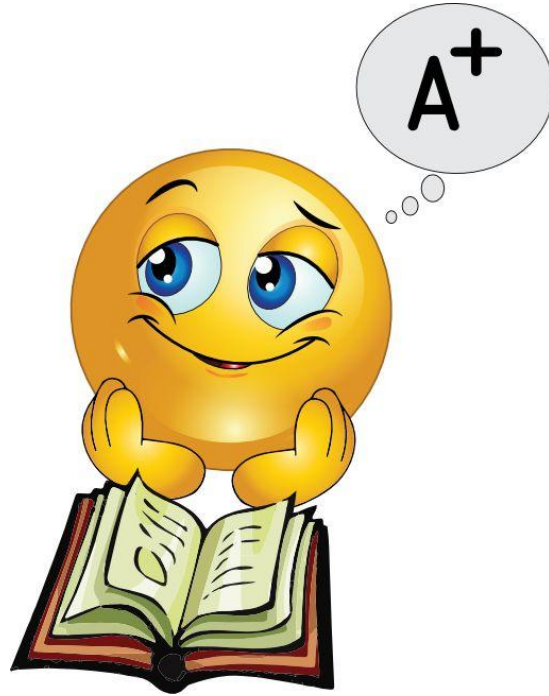




# INTRODUCTION

# WRITING "GOOD" INTRODUCTION

What?



How?

# INTRODUCTION ( 1 PAGE)

- ❑ Describe the Problem
- ❑ State your Contributions.

... and that is all !!

# INTRODUCTION COMPONENTS

- ❑ Background of Topic
- ❑ Research Importance
- ❑ Define Problem
- ❑ My Idea
- ❑ Methodology
- ❑ Further Sections

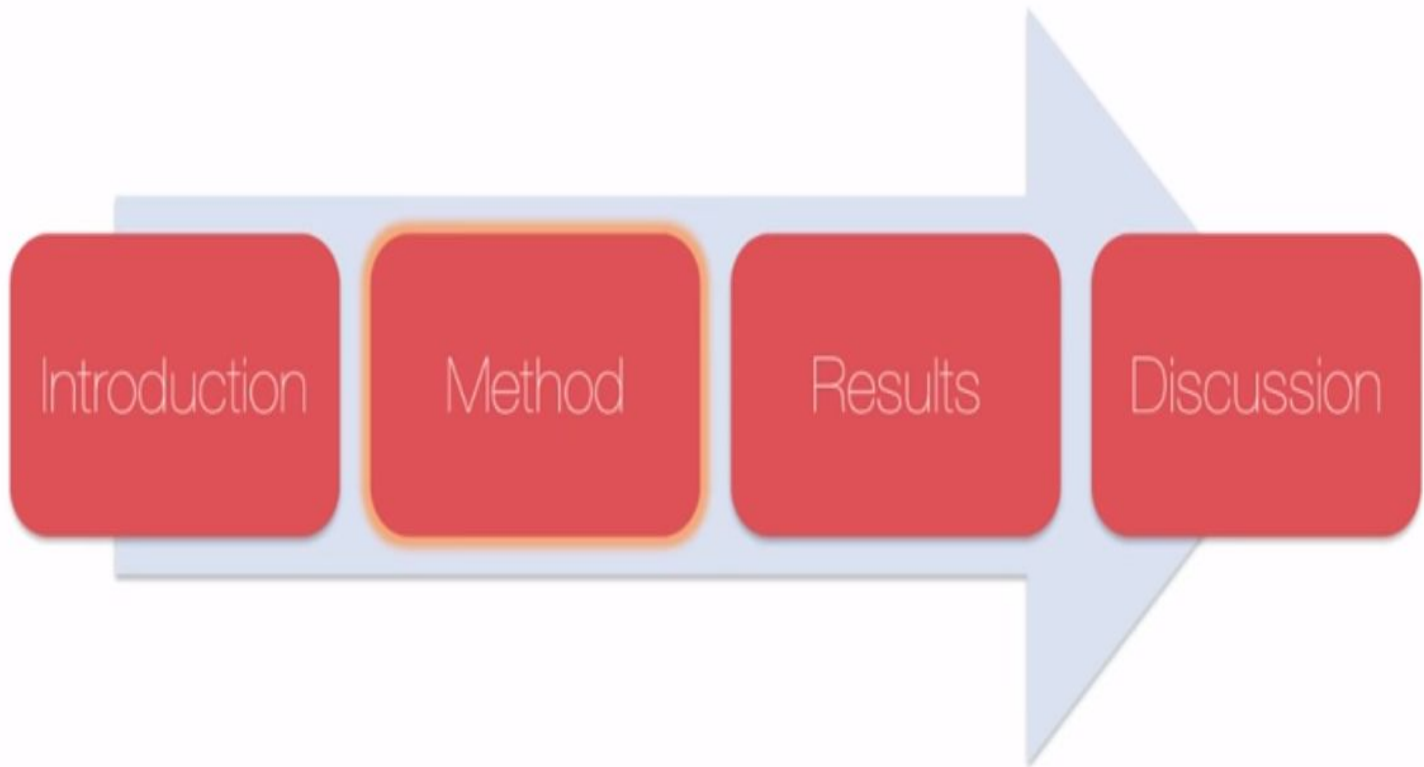


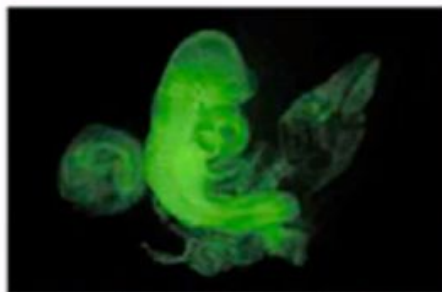
# TIPS

- ❑ Keep it Short!
- ❑ Define Problem!
- ❑ Get Reader Focused and Interested
- ❑ Organisation

# STATE OF ART

- ❑ Brief History of Previous Work
- ❑ Relevance Works
- ❑ Different Approaches





A mouse embryo stained with cells that have passed through stress, appear with a fluorescent protein.

## Acid bath offers easy path to stem cells

Just squeezing or bathing cells in acidic conditions can readily reprogram them into an embryonic state.

BY DAVID CYRANKO

In 2006, Japanese researchers reported<sup>1</sup> a technique for creating cells that have the embryonic ability to turn into almost any cell type in the mammalian body — the so-called induced pluripotent stem (iPS) cells. In recent publications work in Nature<sup>2</sup>, another Japanese team says that it has come up with a surprisingly simple method — exposure to stress, including a low pH — that can make cells that are most similar to those iPS cells, and do it faster and more efficiently.

"In principle, I would have never thought external stress could have this effect," says Yoshiki Saito, a stem-cell researcher at the RIKEN Center for Developmental Biology in Kobe, Japan, and a co-author of the latest studies. It took Shinya Yamanaka, a young stem-cell biologist at the same center, five years to develop the method and persuade Saito and others that it works. "Everyone said it was an artifact — there were some really hard days," says Okakura.

Okakura says that the idea that stressing cells might make them pluripotent came to her when she was culturing cells and noticed that some, after being exposed through a capillary tube, would develop into stem cells similar to that of

stem cells. She decided to try applying different kinds of stress, including heat, starvation and a high-calcium environment. These stresses — a bacterial toxin that perforates the cell membrane, exposure to low pH and physical squeezing — were each able to cause the cells to show markers of pluripotency.

But to earn the name pluripotent, the cells had to show that they could turn into all cell types — demonstrated by injecting them into a mouse embryo. If the introduced cells are pluripotent, the growing cells show up in many tissues of the resulting mouse. This was proved initially and required a dangerous amount. Hundreds of mice made with help from mouse cloning pioneer Teruhiko Wakayama of the University of Tsukuba, Japan, were only barely the mouse. Wakayama, who had initially thought that the project would probably be a "huge effort in vain," suggested stressing fully differentiated cells from newborn mice instead of those from adult mice. This worked to produce a fully grown mouse embryo.

Still, the whole idea was radical, and Okakura kept that glowing mice would be enough to win acceptance was optimistic. Her manuscript was rejected multiple times, she says.

To continue a supply, Okakura had to prove

that the pluripotent cells were converted from adult cells and not pre-existing pluripotent cells. To do this, Okakura used cells from a transgenic T cell, a type of white blood cell whose maturity is clear from a rearrangement that its genes undergo during development. She also sought the consensus of T cells in pluripotent cells on mice. (Okakura called the phenomenon "stress-induced acquisition of pluripotency" (STAP). The words could have a long, running debate.

For years, various groups of scientists have reported finding pluripotent cells in the mammalian body, such as the endogenous adult precursor cells described by Catherine Verheul, a molecular biologist from the University of Minnesota in Minneapolis. But others have had difficulty reproducing such findings. Okakura started the current project in the laboratory of immunologist Shinya Yamanaka (Yamanaka) in Cambridge, Massachusetts, by looking at cells that Yamanaka grew thought to be pluripotent cells isolated from the body. But her results suggested a different explanation: that pluripotent cells are created when the body's cells are under physical stress. "The generation of these cells is essentially Yamanaka's way of reprogramming nature," says Yamanaka, a co-author of the latest paper.<sup>3</sup>

One of the most surprising findings is that the STAP cells can also form placental tissue, something that neither iPS cells nor embryonic stem cells can do. That could make cloning dramatically easier, says Wakayama. Currently, cloning requires extraction of spermatozoa, transfer of a donor nucleus into the egg, in vitro cultivation of an embryo and then transfer of the embryo to a surrogate. If STAP cells can create their own placenta, there could be transformed directly in the surrogate. Wakayama is cautious, however, saying that the idea is currently at "dream stage."

Okakura has already reprogrammed a dozen cell types, including those from the brain, skin, lung and liver. Testing all the methods will work with most, if not all, cell types. On average, she says, 25% of the cells survive the stress and 30% of those convert to pluripotent cells — already a higher proportion than the roughly 1% conversion rate of iPS cells, which take several weeks to become pluripotent. She now wants to use these results to determine how reprogramming is difficult in relation to the varying stress.

Okakura is also trying to make the method work with cells from adult mice and humans.

"The findings are important to understand nuclear reprogramming," says Shinya Yamanaka, who pioneered iPS cell research. "From a practical point of view toward clinical application, I will use new approach to generate iPS-like cells."

1. Yamanaka, S. & Teruhiko, T. Cell 128, 689–696 (2006).
2. Okakura, S. et al. Nature 463, 691–696 (2010).
3. Okakura, S. et al. Nature 463, 691–696 (2010).
4. Jiang, Y. et al. Nature 463, 691–696 (2010).
5. Okakura, S. et al. Nature 463, 691–696 (2010).





# CONTENT OF THE METHOD SECTION

**How does the color of sliced apple change over time, after being dipped in different chemicals ?**

Independent variable: chemical used on the apple

Dependent variable: color of the apple



# CONTENT OF THE METHOD SECTION

**How does the color of sliced apple change over time, after being dipped in different chemicals ?**

What other variables could affect the result ?

- Amount of chemical solution
- Concentration of the solutions
- Kind of apple
- Size of each apple slice
- Time dipped in chemical solution
- Temperature of the room



# Organization of the Method Section

1. Object of the study
2. Treatment for the object
3. Procedure to collect data
4. Procedure to analyze the data

# Content 1 : Object of the Study

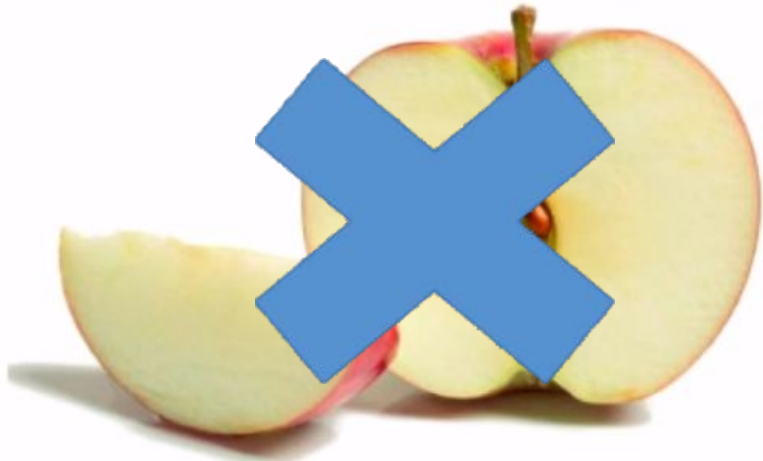
- **Explain what you are studying**



**The object of the study  $\neq$  all the things you used in your experiment**

# Content 2 : Treatments

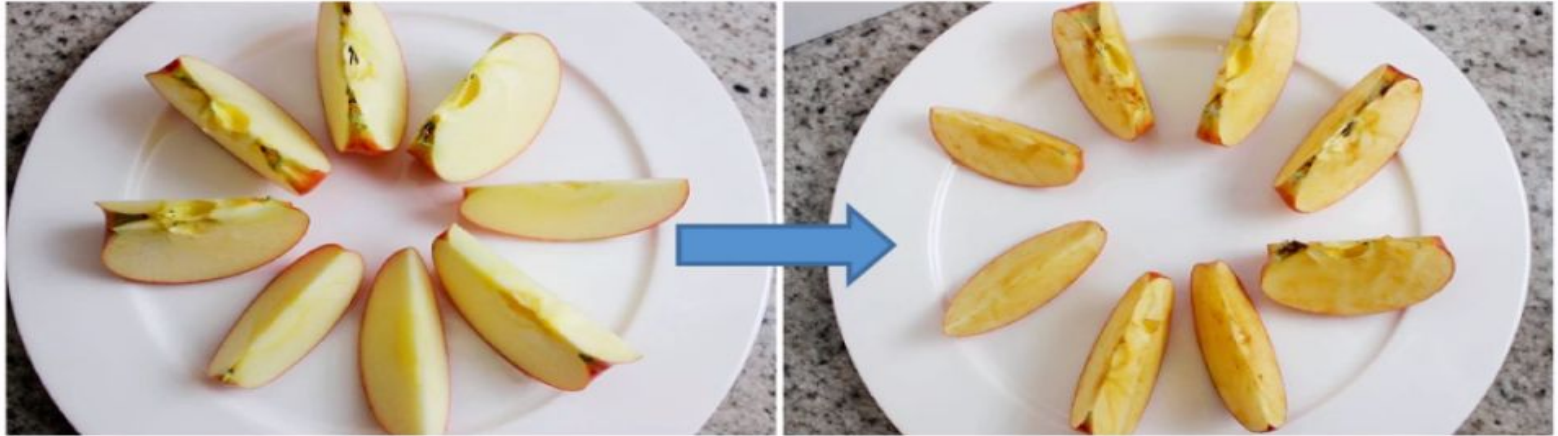
- **Explain what you are doing to your objects**



**This is the independent variable : what you are going to change between conditions.**

# Content 3 : Procedure to collect data

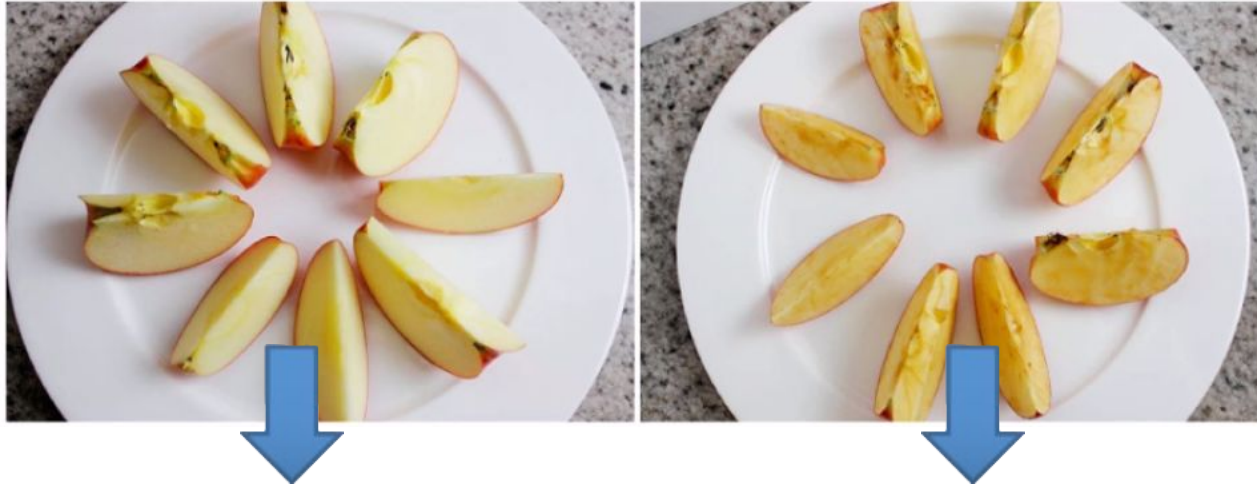
- **Explain what was measured and how it was measured**



**This is dependent variable. The experiment is testing how this changes based on the change in the independent variable.**

# Content 4 : Analysis of the data

- **Transform the data**
- **Formulas, software, statistical analysis**



**Image J software : Convert to RGB scale**

# Organization of the Method Section

- 1. Object of the study**
- 2. Treatment for the object**
- 3. Procedure to collect data**
- 4. Procedure to analyze the data**





Introduction

Method

Results

Discussion

# Content of the Result section

1. **Problems with the data collection**
2. **Main result of the experiment**
3. **Other interesting trends in your data**

**facts , NOT interpretation!**

**Table 1.** Contextualized flood flows of February 2004 in the Kiwitea, Pohangina, and Oroua river channels

River (gauging site) [area km <sup>2</sup> ]	Flood flows (m <sup>3</sup> s <sup>-1</sup> )						Years of record
	Flood of 16 Feb 2004 (95% CI)	Average recurrence interval <sup>a</sup> (yr)	Previous maximum flood (m <sup>3</sup> s <sup>-1</sup> )	Date of previous maximum	Mean annual flood (Q <sub>2.33</sub> ) <sup>b</sup>	Ratio 100 yr : 2.33 yr flood	
Kiwitea (Spur Road) [224]	358 (± 98)	100	166	2 Sept 1988	72	5.03	29
Oroua (Almadale) [329]	450 (± 80)	115	412	12 May 1958	172	2.56	46
Pohangina (Mais) [547]	1111 (± 213)	38	1046	15 Feb 1992	466	2.91	36

Source: Based on Fuller and Heerdegen (2005).

<sup>a</sup>GEV (Generalized Extreme Value) or Gumbel distribution (2-parameter or EV2).

<sup>b</sup>Based on EV2 and including the 15–16 February flood event: Details of these distributions are available in Fuller and Heerdegen (2005).

Ian C. Fuller(2005., The February 2004 floods in the Manawatu, New Zealand : hydrological significance and impact on channel morphology, Journal of Hydrology (NZ) 44 (2): 75-90-2005

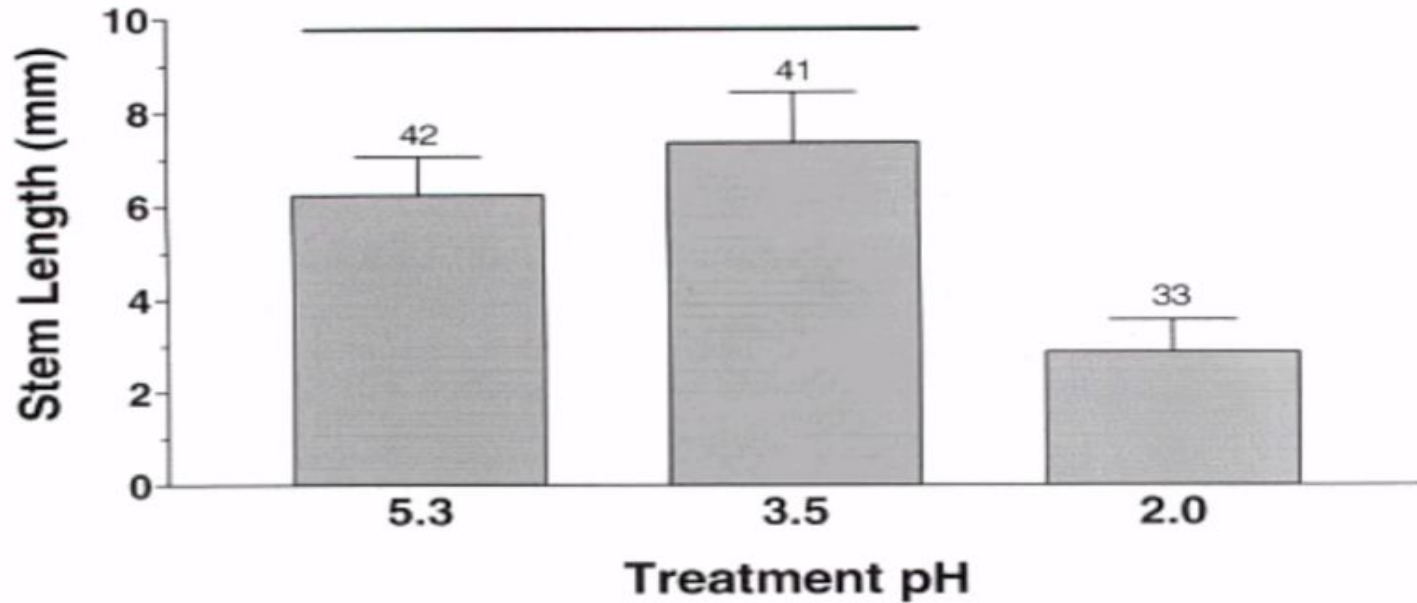
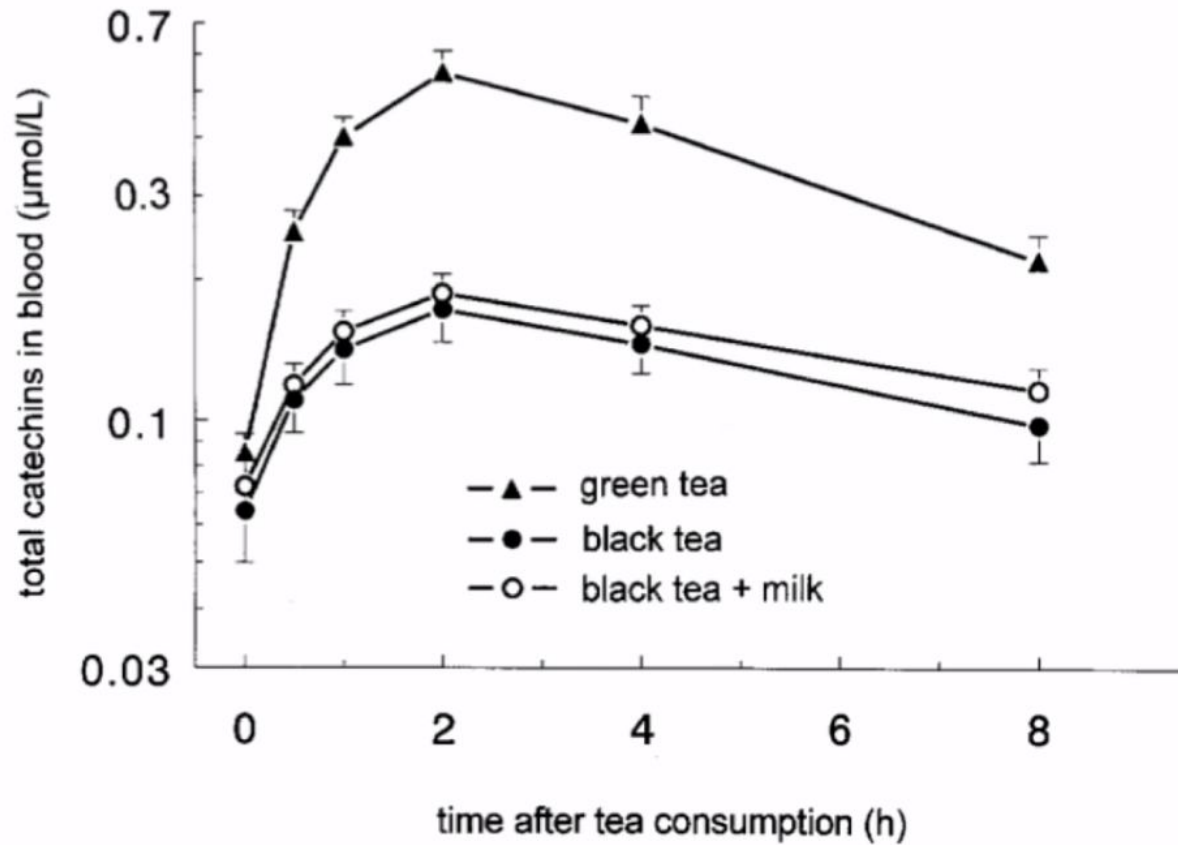


Figure 1. Mean stem length ( $\pm 1$  SD) of seedling clover watered to soil saturation daily for 2.5 weeks with simulated acid rain of varying pH. The control (pH 5.3) was normal city tapwater. The pH 3.5 and 2.0 water was acidified with 2 M sulfuric/ 1 M nitric acid solution. Line over bars indicates groups which were not significantly different (Kruskal-Wallis Test and Dunn's Multiple Comparison's Tests). Number over bar indicates sample size.



van het Hof KH , Kivits GA , Weststrate JA , Tijburg LB. Bioavailability of catechins from tea: the effect of milk, European Journal of Clinical Nutrition [01 May 1998, 52(5):356-359]

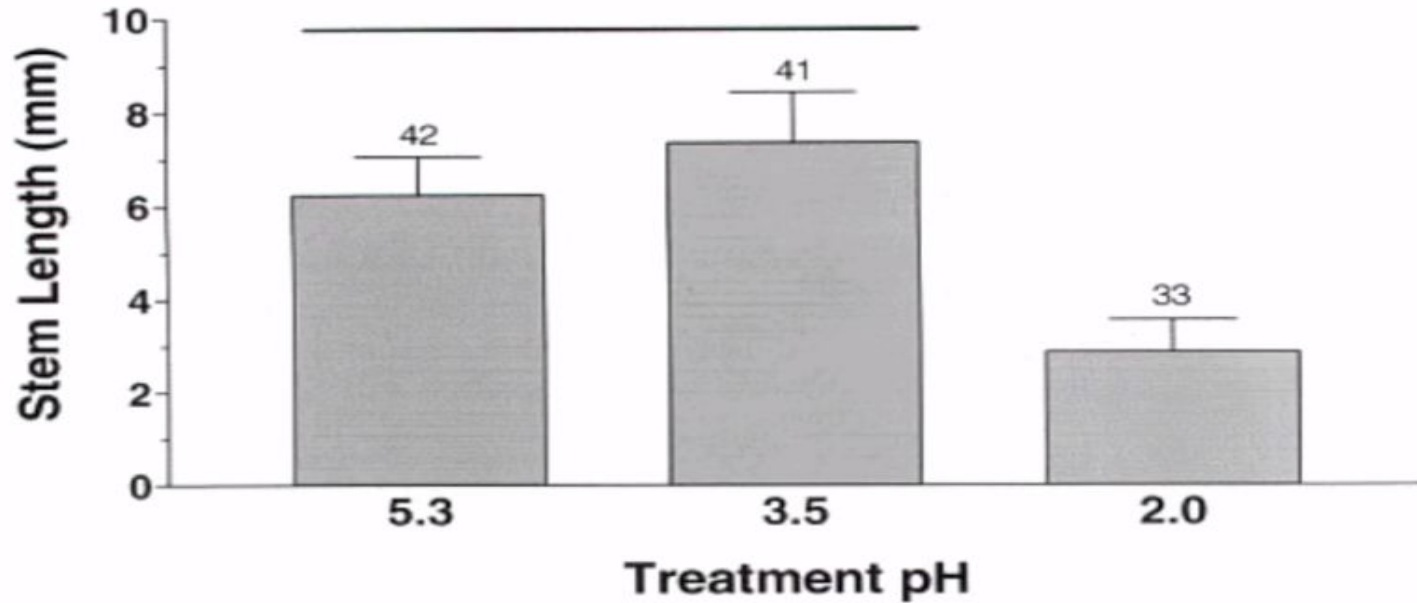
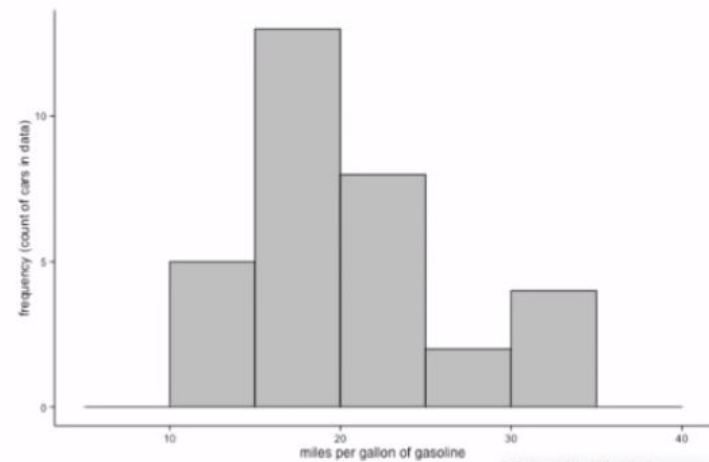
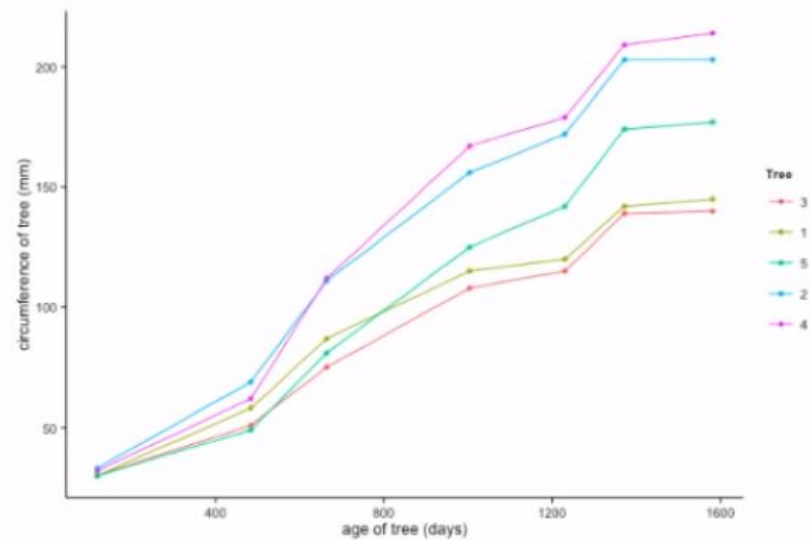
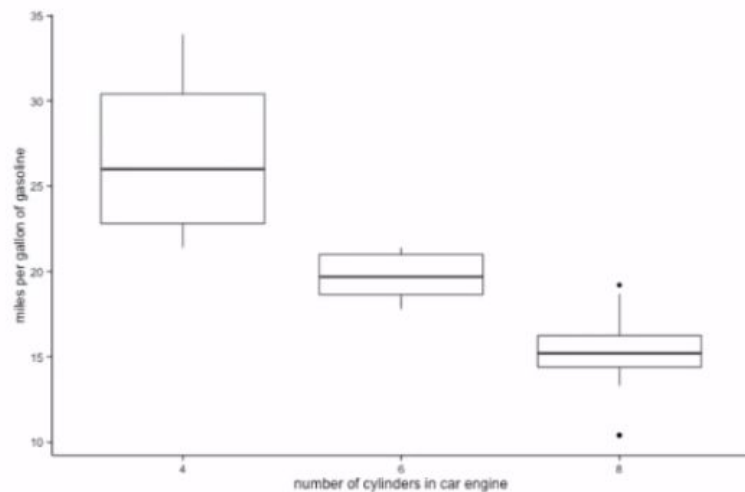
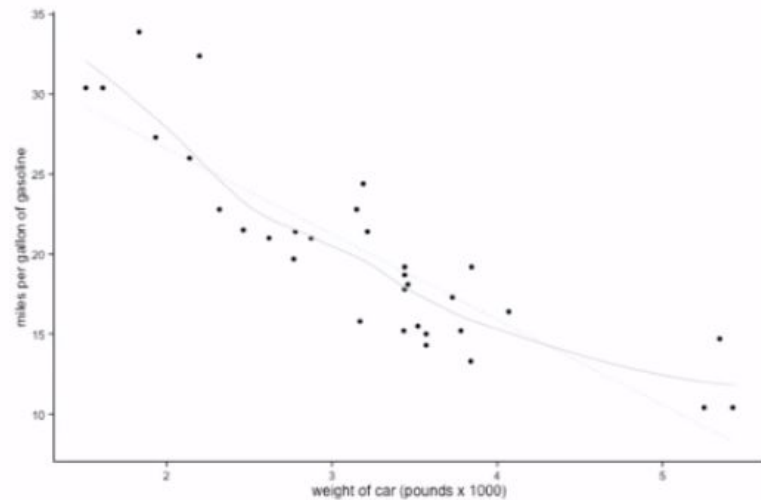


Figure 1. Mean stem length ( $\pm 1$  SD) of seedling clover watered to soil saturation daily for 2.5 weeks with simulated acid rain of varying pH. The control (pH 5.3) was normal city tapwater. The pH 3.5 and 2.0 water was acidified with 2 M sulfuric/ 1 M nitric acid solution. Line over bars indicates groups which were not significantly different (Kruskal-Wallis Test and Dunn's Multiple Comparison's Tests). Number over bar indicates sample size.



# Organization

- 1. Start with a paragraph, not a table or figure.**
- 2. Show tables and figures after they are mentioned in the text.**
- 3. Explain any missing data or problems.**
- 4. Explain the main result (hypothesis).**
- 5. Explain all other interesting trends.**



# Common mistakes to avoid

- **DON'T make the reader interpret the results by themselves from your figures or tables. Explain the outcomes.**
- Example:
  - ~~The results are shown in the following tables and graphs.~~

# Common mistakes to avoid

- **DON'T describe your figures or tables in too much details in sentences.**
- Example:
  - The activity of the enzyme expressed as the variation of the concentration of glucose in millimole per second increased with temperature until a peak at 37 C. it started from a value of 100 mmol/s at 20 C and reached 678 mmol/s at 37 C. It subsequently decreased between 37 and 42C at which point the enzyme became inactive.



Introduction

Method

Results

Discussion

# Issues to address

- How did your actual results differ from your expectation?
- How do you compare your results with the results of other researchers?
- How might you explain any unexpected results?
- Are your explanation for unexpected result justified?

# Organization of the discussion

- Review the main results
  - Connect to your hypothesis and purpose of your study
- Explain the processes behind the results
  - Unexpected results
  - Possible explanations
  - Compare with other research
  - Limitations of your experiment

# Beginning of the Discussion

*At the end of the introduction...*

This study aimed to determine whether gorillas, like humans, or other primates, respond to their auditory environment, and to elucidate the value of auditory stimulation as a method of enrichment for these animals.



*At the start of the discussion...*

The findings from this study suggest that captive gorillas, like humans or other primates, may be influenced by their auditory environment, albeit to a moderate degree.

Wells, D., Coleman, D., & Challis, M. (2006). A note on the effect of auditory stimulation on the behaviour and welfare of zoo-housed gorillas, *Applied Animal Behaviour Science*, 100, 3(4), 327-332

# Problems to avoid

- Do not waste time restating your results.
- Recommendations for further research can be included in either the discussion or conclusion of your paper
- Do not introduce new results in the discussion section
- Use of the first person is generally acceptable.

# FORMATTING



# FORMATTING A RESEARCH PAPER



```
graph TD; A[FORMATTING A RESEARCH PAPER] --> B[ENGINEERING<br/>IEEE, CSE]; A --> C[SOCIAL SCIENCES<br/>MLA, APA]
```

ENGINEERING  
IEEE, CSE

SOCIAL SCIENCES  
MLA, APA

# IEEE PAPER DETAILS

A4 size

8.27" x 11.69"

0.75"

## Sample IEEE Paper for A4 Page Size

0.56"

First Author<sup>#1</sup>, Second Author<sup>#2</sup>, Third Author<sup>#3</sup>

*<sup>#1</sup>First-Third Department, First-Third University  
Address Including Country Name*

<sup>#1</sup>first.author@first-third.edu

<sup>#3</sup>third.author@first-third.edu

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Address Including Country Name*

<sup>#2</sup>second.author@second.com

0.56"

# TITLE AND AUTHOR DETAILS

## Sample IEEE Paper for A4 Page Size

First Author<sup>\*1</sup>, Second Author<sup>\*2</sup>, Third Author<sup>\*3</sup>

*\*First-Third Department, First-Third University  
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*<sup>\*1</sup>first.author@first-third.edu*

*<sup>\*3</sup>third.author@first-third.edu*

*\*Second Company*

*Address Including Country Name*

*<sup>\*2</sup>second.author@second.com*

24pt.

10pt.

11pt.

9pt.

# Times New Roman

**Abstract**—The aim of the Schedule management on calendar is to develop a mobile application to send reminders to people about the upcoming meetings, schedules and appointment. This is done by accessing the mail accounts of any domain and parsing the keywords like meetings, schedules, appointment and its synonyms. These keywords will be stored in a database and accordingly notifications will be generated in the mobile lock screen of the user who has installed the application. This application also lets the user create multiple personalized groups that receives forwarded notifications.

**Keywords:** Scheduling, Calendar, Email, Text-extraction, Content-extraction, Notification.

## I. INTRODUCTION

In the recent years the use of android phones has increased a lot and emails have become a very vital part of running an office. E-mail is a useful method of communication that is instantaneous for stating facts, sharing figures and negotiating with another party and provides an easy way to keep a record of the proceedings. This however requires the users to constantly check their inbox to know about the impending schedules. Also certain applications require the user to have an email account of a particular domain and at times they are paid apps that work on proprietary softwares. Therefore this application allows the user to know about them in the form of notifications. The proposed system will access the mail accounts and parse the keywords like meetings, schedules, appointments and store it in the database. A comparison will be made against a list of predefined keyword list and the message will be sent to in the form of notification on the users display screen/lock screen. The user can navigate the schedule in the calendar for that day/month and can set can set the number of times he/she wishes to view the notification. The user will also be provided with the facility to forward the notification to the group created by him/her.

groups that allows the user to forward the notifications that he wishes to be sent in the group. The user can also set the number of times he/she wishes to see the notifications before the scheduled event.

## III. CURRENT SCENARIO

Android is the most widely use mobile operating system. Some of the present mobile applications are present that parses the content of the email but with a few limitations. Some apps charge users for these services whereas others are iOS tuned apps (considering large android user base). Also some apps access only a users specific mail account (for example Gmail).

- Triple extraction from sentences<sup>[1]</sup>

It focuses on extraction of subject-predicate-object. Commonly used parsers are Stanford parser (uses Java and can extract 118 triplets in 178.1 sec) and OpenNLP (uses C# and can extract 168 triplets in 29.95 sec).

- Open calendar sharing and scheduling with CalDAV<sup>[2]</sup> (Calendarlead project by Apple for interoperability of calendar between independent organizations. They make use of calendar access protocol (CAP). It is based on HTTP to store retrieve, write, and delete calendars located on remote locations
- CHAMPS- change management with planning and scheduling<sup>[3]</sup>

It is a development research at IBM to automatically modify to accommodate considerations such as software fixes, hardware upgrades, etc. it involves automatic creation of change plan and it will do so by applying existing tools and techniques like mathematical schedul.

Left justified

Right justified

→ 0.17"

# HEADINGS

Roman numeral

Centred

CAPS



## I. INTRODUCTION

In the recent years the use of android phones has increased a lot and emails have become a very vital part of running an office. E-mail is a useful method of communication that is instantaneous for stating facts, sharing figures and negotiating with another party and provides an easy way to keep a record of the proceedings. This however requires the users to constantly check their inbox to know about the impending schedules. Also certain applications require the user to have an email account of a particular domain and at times they are paid apps that work on proprietary softwares. Therefore this application allows the user to know about them in the form

# HEADINGS

Upper case alphabetic

Left justified

Italic

No. followed by paranthesis

A. *Subsection Heading Here*

Subsection text here.

1) *Subsubsection Heading Here*: Subsubsection text here.

# DIAGRAMS

- USE IN COLUMN
- CONTRAST
- USE OF SOLID FILL COLORS



Justified text

Fig. 1. Flowchart of the Proposed system: Calendar Application

8pt. Regular font/Times  
New Roman

# DIAGRAMS

mail account.

**Testing of mail retrieval code** To test if mails are retrieved from dummy mail accounts. A dummy gmail account was created upon which mail retrieval code was tested.

**Testing of keyword extraction** To test if keywords related to meetings and schedules are extracted correctly.

**For Extraction of keywords** Matching patterns could be found in mail contents. However, all the words were jumbled up from different mails and hence difficult to store in DB.

**Solution** we designed it to parse contents of every mail, in which strings containing "meeting" till the end of "full stop" were considered. Keyword extraction was performed on the dummy mail contents.

**Problems faced during the making of User Interface** Initially we began designing the UI using navigation drawer but it gave problems while navigating through different options. In navigation drawer, fragments are used ,i.e MainActivity class which extends Fragment class. But, this had issues. This resulted in errors while importing Activity class programs in Fragment class.

**Solution:** Now we are using menu bar in order to avoid



Fig. 2. User Interface of the application




Not numbered

## REFERENCES

Sq. bracket

8 pt.

Times New  
Roman

- 
- [1] <http://programmers.stackexchange.com/questions/133778/how-can-i-extract-words-from-a-sentence-and-determine-what-part-of-speech-each-i>
  - [2] <https://www.comp.nus.edu.sg/~tancl/publications/c2002/5thDAS2002-WordandSentenceExtractionUsingIP.pdf>
  - [3] <http://www.quora.com/What-are-good-tools-to-extract-key-words-and-or-topics-tags-from-a-random-paragraph-of-text>
  - [4] <http://programmers.stackexchange.com/questions/133778/how-can-i-extract-words-from-a-sentence-and-determine-what-part-of-speech-each-i>
  - [5] <http://www.quora.com/What-are-good-tools-to-extract-key-words-and-or-topics-tags-from-a-random-paragraph-of-text>
  - [6] <http://www.email2db.com/>
  - [7] <http://www.quora.com/What-are-good-tools-to-extract-key-words-and-or-topics-tags-from-a-random-paragraph-of-text>
  - [8] <http://stackoverflow.com/questions/399165/extracting-data-from-an-email-message-or-several-thousand-emails-exchange-bas>

# ADDITIONAL FORMATTING

HYPERTEXTS AND URL TO BE REMOVED

MINOR WORDS NEED NOT BE ~~CAPITALIZED~~

EMAIL ID IS MANDATORY

ALGORITHMS / EQUATIONS

# CONCLUSION

# CONCLUSION SECTION

Different Types of Research Paper...

- Technical, Non Technical, Argument, Analysis, Problem solving, etc..

Do we need different approach?

- jein

Strategy

- Return to the Opening



# STRATEGY CONT...

## **Return to the Opening**

(The Research Project: How to write it, Ralph Berry)

"The conclusion should return to the opening, and examine the original purpose in the light of the data assembled."

# STRATEGY CONT..

- Restate
- Summarize arguments, findings, analysis
- Leaves a strong impression
- All trains of thoughts described bound together

# A SAMPLE

## Sample Conclusion for History Paper

Abraham Lincoln was a man of character, a prominent activist in civil rights, and a shrewd politician. His Gettysburg Address became the most quoted political speech in American History, demonstrating his passion for nationalism, equal rights, and democracy. His assassination was a tragedy that helped galvanize his legacy, rather than weaken it. By all counts, and with proven results, it is no wonder that he was considered by many to have been the *greatest of the United States' presidents*.

# IMPORTANT!

- No Details
- No introduction of:
  - New topic
  - New Example
  - New Argument

No new information at all!





# FUTURE WORK

- Why?
- Constrained env. and lack of resource
- Un-resolved
- Research limitations: Identifying and proposing solution
- Notice

# RESOURCE/CREDITS

<https://hoavouu.com/images/file/4WSwgmAx0QgQAAZh/the-research-project-how-to-write-it-by-ralph-berry.pdf>

<https://www.wikihow.com/Sample/Conclusion-for-History-Paper>

<https://www.iee802.org/22/document/format-rules.html>

[www.elsevier.com/locate/foodchem](http://www.elsevier.com/locate/foodchem)

<https://www.youtube.com/watch?v=BwDnbWrZSvA&t=244s>

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Thank you!

