# Thesis Title

## Name of Author

# Thesis Title

Research Thesis

# Name of Author

This research was carried out under the supervision of Prof. Big Shot, in the Faculty of Computer Science.

(The grad school guidelines now require that you mention the following regarding publications of your thesis work; but of course, remove this parenthesized note...; this is to be found in the `thesis-fields.tex` file. Note also that the document may need to be processed several times before the list of publications actually appears)

Some results in this thesis have been published as articles by the author and research collaborators in conferences and journals during the course of the author's doctoral research period, the most up-to-date versions of which being:

Jane Smith and Mish Talem. Dynamic lettuce programming. In *Proceedings of AGRIALGO 2010*, pages .154–123 Springer, .2010

Big Shot and Mish Talem. Efficient solutions of foliage-related problems. In Eddy Kramer, editor, *Greenleaf algorithms*, volume 231 of *Computer Science and Agriculture*, pages 239–.254 Addison-Wesley, .2011

# Acknowledgements

I would like to thank my advisor, my parents, my friends, etc. etc.

Add any thank-yous, acknowledgements, personal comments you wish to make here (in `personal-acks.tex`).

Note that this acknowledgements section only gets printed in the post-exam version of the thesis (i.e. if you leave out the `beforeDefense` option to your document class in `thesis.tex`.)

# Contents

# List of Figures

# Abstract

At this point you write the abstract of your work, in the main language in which it is written (in this template - English). Graduate school regulations require the abstract to constitute an independent whole and be understood to a reader with general knowledge of the field. Use complete sentences and make few or no citations. Do not refer to the main body of the work and do not use uncommon shorthand, symbols and terms unless you have room for explaining them. The English abstract should be between 200 and 500 words long.

So this should contain a few more paragraphs...

Suspendisse vitae elit. Aliquam arcu neque, ornare in, ullamcorper quis, commodo eu, libero. Fusce sagittis erat at erat tristique mollis. Maecenas sapien libero, molestie et, lobortis in, sodales eget, dui. Morbi ultrices rutrum lorem. Nam elementum ullamcorper leo. Morbi dui. Aliquam sagittis. Nunc placerat. Pellentesque tristique sodales est. Maecenas imperdiet lacinia velit. Cras non urna. Morbi eros pede, suscipit ac, varius vel, egestas non, eros. Praesent malesuada, diam id pretium elementum, eros sem dictum tortor, vel consectetuer odio sem sed wisi.

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Etiam euismod. Fusce facilisis lacinia dui. Suspendisse potenti. In mi erat, cursus id, nonummy sed, ullamcorper eget, sapien. Praesent pretium, magna in eleifend egestas, pede pede pretium lorem, quis consectetuer tortor sapien facilisis magna. Mauris quis magna varius nulla scelerisque imperdiet. Aliquam non quam. Aliquam porttitor quam a lacus. Praesent vel arcu ut tortor cursus volutpat. In vitae pede quis diam bibendum placerat. Fusce elementum convallis neque. Sed dolor orci, scelerisque ac, dapibus nec, ultricies ut, mi. Duis nec dui quis leo sagittis commodo.

# Chapter 1

# Introduction

Here you can introduce the field, survey past results, give context, use citations of course... (e.g. [Pap94]). It is probably worthwhile to clarify the goals or targets of the research and describe the process, unless this is done later.

You can also introduce *a key concept* (or rather, several) without formally defining them until later on.

### An unnumbered subsection

You may want to break up the intro into parts with titles. Subsectioning without numbering is an option you might want to consider.

Some people include a specific section overviewing the results ("In Chapter so-and-so, we will see how etc.") which is also a way of describing the structure of the thesis. But this is not necessary.

### Thesis options and appearance

Please note that the `iitthesis` class has several options when you use it, such as:

- `fullpageDraft` to avoid the margins necessary for proper binding when you make the final print

- `beforeDefense` makes the personal acknowledgements invisible; use this to print the copies you submit initially to the grad school for sending to the opponent panel, i.e. thesis readers (who shouldn't see those parts). For the final submission, after having successfully defended — drop this option.

- `noabbrevs` no notation & abbreviations list will be included in the thesis.

### Setting thesis meta-data and publication information

The document class used to generate this document defines several commands you can use to set information regarding your thesis, which is used in the title pages and

elsewhere in the front matter. Every (or almost every) command has an English and a Hebrew variant, with a `English` or `Hebrew` suffix to the command name. Examples:

- `\titleHebrew`, `\titleEnglish`

- `\authorHebrew`, `\authorEnglish`

- `\JewishDateHebrew`, `\JewishDateEnglish`

- `\GregorianDateHebrew`, `\GregorianDateEnglish`

- `\publicationinfoHebrew`, `\publicationinfoEnglish`

The file `misc/thesis-fields.tex` contains invocations of several such commands (some of them commented-out with `%`), and some additional information about them.

# Chapter 2

# Preliminaries

A preliminaries chapter is not necessary, but it may be a good idea to use it for presenting your theoretical/mathematical framework in a more detailed and technical way than the introduction, and to perhaps establish some basic lemmata/observations common to multiple chapters of your thesis.

## 1.2   Some section

Let's define some concept we'll be using throughout the thesis.

**Definition .1.1.2** The *von Neumann model* of a computer, also known as the *Princeton architecture* is an architecture for digital computers, which consists of a processing units, containing an ALU and processing registers; a control unit consisting of an instruction register and a program counter; a memory unit which stores both data and instructions; and input-and-output mechanisms.

# Chapter 3

# A main chapter

## 1.3 Introduction

You might have a per-chapter mini-intro, possibly tying in to the relevant part of the general intro.

## 2.3 A section

Lorem ipsum dolor sit amet, consectetuer adipiscing elit. Ut purus elit, vestibulum ut, placerat ac, adipiscing vitae, felis. Curabitur dictum gravida mauris. Nam arcu libero, nonummy eget, consectetuer id, vulputate a, magna. Donec vehicula augue eu neque. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Mauris ut leo. Cras viverra metus rhoncus sem. Nulla et lectus vestibulum urna fringilla ultrices. Phasellus eu tellus sit amet tortor gravida placerat. Integer sapien est, iaculis in, pretium quis, viverra ac, nunc. Praesent eget sem vel leo ultrices bibendum. Aenean faucibus. Morbi dolor nulla, malesuada eu, pulvinar at, mollis ac, nulla. Curabitur auctor semper nulla. Donec varius orci eget risus. Duis nibh mi, congue eu, accumsan eleifend, sagittis quis, diam. Duis eget orci sit amet orci dignissim rutrum.

Let's cite a source: [Yao77].

An equation...

$$e = mc^2 \tag{)1.3}$$

In section 3.3 below, we will state some theorems

## 3.3 Results... and theorem-like environments

What's so special about the theorem-like environments used here? There are several packages which offer the capability of defining these, mainly `amsthm`, `ntheorem` and also

`thmtools`. (The last is probably also the most feature-full and versatile, but I'm not familiar with it and the first two are the popular ones.) Many people writing a Technion thesis start with `amsthm`, only to find out it has conflicts with Hebrew... also, there's the issue of aliasing (same counter for lemmata and theorems, but having `\autoref` and similar commands know what they're referencing.) This is all neatly resolved in `iitthesis-extra.sty` with `amsthm`-like-looking environments actually done with nthrerom.

**Theorem .1.3** *This is the first numbered theorem in this thesis.*

And we can refer to it using `ref`: 1.3 and get the number, or use hypertex's `autoref`: Theorem 1.3.

**Corollary .2.3** *There are no lemmata appearing before theorems in this thesis.*

**Theorem.** *This is the second theorem, unnumbered.*

**Theorem** ([Knu73, Theorem 2]). *This is an unnumbered theorem cited from elsewhere. The quick brown fox jumped over the lazy dog. ... and it was Knuth's dog.*

*Note.* This is a note environment. The quick brown fox jumped over the lazy dog. The quick brown fox jumped over the lazy dog.

**Definition .1.3.3** An *quick brown fox* is a fox which is not only fast and agile but is also characterized by brown fur. Such foxes sometimes tend to jump over lazy dogs.

**Lemma .2.3.3** *This is a lemma. The quick brown fox jumped over the lazy dog. The quick brown fox jumped over the lazy dog.*

Even though Lemma 2.3.3 and Definition 1.3.3 share the "same" counter, when referring to them, their names are used automagically.

Here's a proof of the lemma:

*Proof.* Nam dui ligula, fringilla a, euismod sodales, sollicitudin vel, wisi. Morbi auctor lorem non justo. Nam lacus libero, pretium at, lobortis vitae, ultricies et, tellus. Donec aliquet, tortor sed accumsan bibendum, erat ligula aliquet magna, vitae ornare odio metus a mi. Morbi ac orci et nisl hendrerit mollis. Suspendisse ut massa. Cras nec ante. Pellentesque a nulla. Cum sociis natoque penatibus et magnis dis parturient montes, nascetur ridiculus mus. Aliquam tincidunt urna. Nulla ullamcorper vestibulum turpis. Pellentesque cursus luctus mauris.

It's common to conclude proofs with a "quod erat demonstratum" (QED) symbol. The command will be `\qed` (although you can arrange for this symbol to be appended automatically to all proofs with some LaTeX trickey). ∎

And here's a proof of Theorem 1.3 using the `proofof` environment.

*Proof of Theorem 1.3.* Nulla malesuada porttitor diam. Donec felis erat, congue non, volutpat at, tincidunt tristique, libero. Vivamus viverra fermentum felis. Donec nonummy pellentesque ante. Phasellus adipiscing semper elit. Proin fermentum massa ac quam. Sed diam turpis, molestie vitae, placerat a, molestie nec, leo. Maecenas lacinia. Nam ipsum ligula, eleifend at, accumsan nec, suscipit a, ipsum. Morbi blandit ligula feugiat magna. Nunc eleifend consequat lorem. Sed lacinia nulla vitae enim. Pellentesque tincidunt purus vel magna. Integer non enim. Praesent euismod nunc eu purus. Donec bibendum quam in tellus. Nullam cursus pulvinar lectus. Donec et mi. Nam vulputate metus eu enim. Vestibulum pellentesque felis eu massa.

**Proposition .3.3.3** *A proposition environment. The quick brown fox jumped over the lazy dog. The quick brown fox jumped over the lazy dog.*

**Observation .4.3.3** The moon revolves around the earth.

There are several other theorem-like environments, of various kinds, defined in `iitthesis-extra.sty`.

### 1.3.3 A subsection

We've started a subsection.

---
**Algorithm 1.3** A nice algorithm

---
1: **for** $n$ times **do**
2:     Do something.
3:     Do something else.
4: **end for**
5: And do one last thing.

---

It is recommended to use `algorithmicx` over `algorithmic` for algorithms, like in Algorithm 1.3, as it has less conflicts with Hebrew babel (regardless of whether you have Hebrew in your algorithms or not). Also, `iitthesis-extra.sty` provides it with a necessary workaround.

### 2.3.3 A second subsection

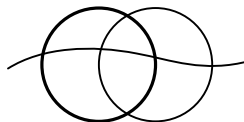In this subsection we'll have a figure.



Figure :1.3 Two circles and a wavy line.

# Chapter 4

# Conclusion and open questions

This kind of chapter can include may different things (or only some of them):

- Discussion of results

- Conclusions from the results or from the process in general

- Open questions for future research, resulting from the research performed or from the results obtained

But not things like the bibliography or other back matter which is generated outside of this chapter.

## 1.4 Some conclusion

Here is what I conclude.

## 2.4 Some open questions

**A question in brief.** In chapter 3 we explored a certain subject, but what about this-or-that idea? Perhaps it is worth exploring. Can one produce interesting results?

**A second question in brief.** A broader exposition of the question and indications of directions or ideas regarding its resolution.

# Appendix A

# Some sort of an appendix

You may want to include appendices of your own volition. Also, if you've developed any computer software, that needs to go in as an appendix as well.

## A.1   A section

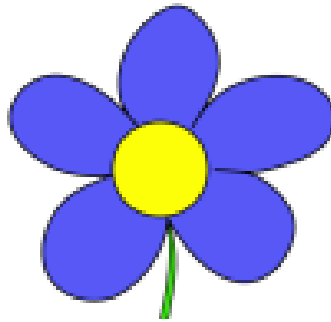Some appendix content here. And something nice to finish things off:



Figure A.1: A Flower.

# Bibliography

[Hoe63]  Wassily Hoeffding. Probability inequalities for sums of bounded random variables. *Journal of the American Statistical Association*, 58:13–30, .1963

[Knu73]  Donald E. Knuth. *The Art of Computer Programming, Volume I: Fundamental Algorithms, 2nd Edition.* Addison-Wesley, .1973

[Pap94]  Christos M. Papadimitriou. *Computational Complexity.* Addison-Wesley, Reading, Massachusetts, .1994

[Yao77]  Andrew Chi-Chih Yao. Probabilistic computations: Toward a unified measure of complexity (extended abstract). In *18th FOCS*, pages 222–227, .1977

... ואילו עמוד זה של התקציר-המורחב בעברית — שהינו העמוד השני בתקציר-המורחב מבחינת רצף התוכן, ונמצא ראשון בקובץ ה-PDF — ממוספר ב-ii. המטרה במספור בסדר ה"הפוך" היא, שבעת ההדפסה לא יהיה צורך להפוך דפים, לשנות את סדרם וכולי — רק להדפיס ולכרוך.

# תקציר

כאן יבוא תקציר מורחב בעברית (כאשר שפת החיבור העיקרית היא אנגלית). היקף התקציר יהיה 1000-2000 מילים. התקציר יהווה שלמות בפני עצמו ויהיה מובן לקורא בעל ידיעות כלליות בנושא.

בית הספר ללימודי מוסמכים מנחה מספר הנחיות לגבי התקציר בעברית:

- על התקציר להיכתב במשפטים מקושרים שלמים.

- בדרך-כלל אין לציין בתקציר מקורות ספרותיים וציטוטים.

- אין להתייחס למספר של פרק, סעיף, נוסחה, ציור או טבלה שבגוף החיבור, ואין להשתמש בקיצורים, סמלים ומונחים לא מקובלים, אלא אם יש בתקציר די מקום לזיהויים.

לעתים יש בכל-זאת יש צורך לכלול פקודה הכוללת קישור פנימי או חיצוני בתוך התקציר העברי; במצבים כאלו כדאי דרך-כלל לעטוף את הפקודה היוצרת את הקישור בתוך פקודת {}\textenglish כדי למנוע כל מיני פורענויות בלתי-רצויות, כגון כישלון בהידור קובץ ה-PDF או שימוש בגופן העברי באופן אשר עלול שלא להנעים לעין. לדוגמה: נניח שיש לנו צורך לצטט מקור ביבליוגרפי. אם נעשה זאת סתם כך: {Hoeffding}cite\, נקבל: [Hoe63]; אם נעטוף את פקודת הציטוט, כך: {{Hoeffding}cite\}textenglish\, נקבל [Hoe63] (כפי שהציטוטים נראים גם בטקסט באנגלית).

### תת-חלק בתקציר המורחב

תוכן מקוצר לגבי נושא מסוים. התייחסות למושג מסוים שהחיבור בוחן. וכולי וכולי.

### נקודה מעניינת לגבי העמודים בעברית

שימו לב כי העמודים בעברית אמורים להיות מיוצרים בסדר ה"הפוך", הווה אומר העמוד האחרון בקובץ ה-PDF הוא הכריכה העברית, לפניו השער העברי, ודפי התקציר צריכים להופיע בסדר הפוך (וכן במספור רומי, לפי נהלי הטכניון). כך אם נתבונן במספר שבתחתית עמוד זה — אשר צריך להיות העמוד הראשון בתקציר-המורחב מבחינת רצף התוכן, והינו העמוד האחרון מבין עמודי התקציר-המורחב אחרון בקובץ ה-PDF — נמצא את המספר i ...

המחקר בוצע בהנחייתו של פרופסור אישחשוב עצמוני, בפקולטה למדעי המחשב.

(ההתייחסות לפרסומים, שמופיעה להלן, הינה הכרחית לפי תקנות ביה"ס ללימודי מוסמכים; כמובן שיש למחוק את ההערה הזו שבסוגריים... תוכן זה נמצאה בקובץ thesis-fields.tex. כן ייתכן שיהיה צורך להדר את המסמך פעם או פעמיים נוספות עד שהרשימה אכן תופיע כראוי.)

חלק מן התוצאות בחיבור זה פורסמו כמאמרים מאת המחבר ושותפיו למחקר בכנסים ובכתבי-עת במהלך תקופת מחקר הדוקטורט של המחבר, אשר גרסאותיהם העדכניות ביותר הינן:

Jane Smith and Mish Talem. Dynamic lettuce programming. In *Proceedings of AGRIALGO 2010*, pages 123–154. Springer, 2010.

Big Shot and Mish Talem. Efficient solutions of foliage-related problems. In Eddy Kramer, editor, *Greenleaf algorithms*, volume 231 of *Computer Science and Agriculture*, pages 239–254. Addison-Wesley, 2011.

# תודות

אני רוצה להודות למנחה שלי, להוריי, לחבריי, וכו' וכו'.

אפשר להוסיף עוד תודות והערות אישיות כאן.

שים/י לב: קטע זה של תודות מודפס בפועל רק בגרסת החיבור שלאחר-הבחינה (הווה אומר רק אם הסרת את האפשרות beforeDefense מן האפשרויות המועברות ל-document class בקובץ thesis.tex).

# כותרת החיבור

חיבור על מחקר

לשם מילוי חלקי של הדרישות לקבלת התואר
דוקטור לפילוסופיה

# שם המחבר

# כותרת החיבור

שם המחבר