

# Kronos: A Virtual Reality Roguelike

Reily Stanford  
Union City, Tennessee  
rstanfo1@utm.edu

Enrique Tejada  
Martin, Tennessee  
enrgteje@ut.utm.edu

## ABSTRACT

Kronos is a virtual reality video game with roguelike elements in which time is falling apart at the seams. It falls on the protagonist, Kronos, to restore the timeline to its chronological order. The player is capable of manipulating time to assist with handling any challenges faced. The game is a first-person shooter where you are traveling between a mismatch of time periods in order to get back to the present to restore order. Kronos is built using Unreal Engine 5 and the plugins it provides. Some of the behaviors of the enemies within the game, the item effects, and the weapon mechanics are created using the C++ language. There are a variety of floors, each having its own time period theme.

## Author Keywords

Authors' choice; of terms; separated; by semicolons; include commas, within terms only; this section is required.

## 1. INTRODUCTION

Kronos is a virtual reality game that is set in the first person. The art style is similar to DOOM (1993) in that the enemies are sprites that always face you. The game is a shooter where you are tasked to bring the timeline to its original state. Someone has disrupted the chronological order of events leading Kronos, the protagonist, to fix the timeline by any means possible. There are three levels that each correspond to a time period where you can easily tell that time has been altered. This is apparent when you see enemies that do not match the current time period the level is set in. A mechanic that the game has is procedural generation of level layouts. The game offers three methods of movement: teleportation, head-based locomotion, and hand-based locomotion. With teleportation, you move by pointing your hand to a specific location and pressing the movement button. The other option, locomotion, moves like a standard video game in which you hold the movement button to move in your desired direction. Each level is concluded by defeating a boss enemy that is stronger than the enemies you have been fighting on the current floor. There will be multiple weapons, items that affect your player's stats, and a variety of enemies on each floor.

## 2. TECHNICAL SPECIFICATIONS

The project is built with Unreal Engine 5 and we used Unreal's Blueprints, a visual programming language, to create the logic of the game. For complex functionality that cannot be built with Blueprints, we create with C++. We use a plugin called [ProceduralDungeon by BenPython](#) that places the rooms into a playable layout. To plan our roadmap we used [Milanote](#). The assets we have in our project come from [Humble Bundle](#), [itch.io](#), and [Mixamo](#). As for source control, we used Git LFS, which is used for large files on github, and the built-in source control for Unreal Engine.

## 3. PAGE SIZE AND COLUMNS

On each page your material should fit within a rectangle of 7 × 9.15 inches (18 × 23.2 cm), centered on a US Letter page

(8.5 × 11 inches), beginning 0.85 inches (1.9 cm) from the top of the page, with a 0.3 inches (0.85 cm) space between two 3.35 inches (8.4 cm) columns. Right margins should be justified, not ragged. Please be sure your document and PDF are US letter and not A4.

## 4. TYPESET TEXT

The styles contained in this document have been modified from the default styles to reflect ACM formatting conventions. For example, content paragraphs like this one are formatted using the Normal style.

L<sup>A</sup>T<sub>E</sub>X sometimes will create overfull lines that extend into columns. To attempt to combat this, the .cls file has a command, \sloppy, that essentially asks L<sup>A</sup>T<sub>E</sub>X to prefer underfull lines with extra whitespace. For more details on this, and info on how to control it more finely, check out <http://www.economics.utoronto.ca/osborne/latex/PMAKEUP.HTM>.

### 4.1 Title and Authors

Your paper's title, authors and affiliations should run across the full width of the page in a single column 17.8 cm (7 in.) wide. The title should be in Helvetica or Arial 18-point bold. Authors' names should be in Times New Roman or Times Roman 12-point bold, and affiliations in 12-point regular.

See \author section of this template for instructions on how to format the authors. For more than three authors, you may have to place some address information in a footnote, or in a named section at the end of your paper. Names may optionally be placed in a single centered row instead of at the top of each column. Leave one 10-point line of white space below the last line of affiliations.

### 4.2 Abstract and Keywords

Every submission should begin with an abstract of about 150 words, followed by a set of Author Keywords and ACM Classification Keywords. The abstract and keywords should be placed in the left column of the first page under the left half of the title. The abstract should be a concise statement of the problem, approach, and conclusions of the work described. It should clearly state the paper's contribution to the field of HCI.

### 4.3 Normal or Body Text

Please use a 10-point Times New Roman or Times Roman font or, if this is unavailable, another proportional font with serifs, as close as possible in appearance to Times Roman 10-point. Other than Helvetica or Arial headings, please use sans-serif or non-proportional fonts only for special purposes, such as source code text.

### 4.4 First Page Copyright Notice

This template include a sample ACM copyright notice at the bottom of page 1, column 1. Upon acceptance, you will be provided with the appropriate copyright statement and unique DOI string for publication. Accepted papers will be

Name	Test Conditions		
	First	Second	Final
Marsden	223.0	44	432,321
Nass	22.2	16	234,333
Borriello	22.9	11	93,123
Karat	34.9	2200	103,322

**Table 1.** Table captions should be placed below the table. We recommend table lines be 1 point, 25% black. Minimize use of table grid lines.

distributed in the conference publications. They will also be placed in the ACM Digital Library, where they will remain accessible to thousands of researchers and practitioners worldwide. See [http://acm.org/publications/policies/copyright\\_policy](http://acm.org/publications/policies/copyright_policy) for the ACM’s copyright and permissions policy.

#### 4.5 Subsequent Pages

On pages beyond the first, start at the top of the page and continue in double-column format. The two columns on the last page should be of equal length.

#### 4.6 References and Citations

Use a numbered list of references at the end of the article, ordered alphabetically by last name of first author, and referenced by numbers in brackets [?, ?, ?]. Your references should be published materials accessible to the public. Internal technical reports may be cited only if they are easily accessible (i.e., you provide the address for obtaining the report within your citation) and may be obtained by any reader for a nominal fee. Proprietary information may not be cited. Private communications should be acknowledged in the main text, not referenced (e.g., “[Borriello, personal communication]”).

References should be in ACM citation format: [http://acm.org/publications/submissions/latex\\_style](http://acm.org/publications/submissions/latex_style). This includes citations to internet resources [?, ?, ?, ?] according to ACM format, although it is often appropriate to include URLs directly in the text, as above.

## 5. SECTIONS

The heading of a section should be in Helvetica or Arial 9-point bold, all in capitals. Sections should *not* be numbered.

### 5.1 Subsections

Headings of subsections should be in Helvetica or Arial 9-point bold with initial letters capitalized. For sub-sections and sub-subsections, a word like *the* or *of* is not capitalized unless it is the first word of the heading.

#### 5.1.1 Sub-subsections

Headings for sub-subsections should be in Helvetica or Arial 9-point italic with initial letters capitalized. Standard \section, \subsection, and \subsubsection commands will work fine in this template.

## 6. FIGURES/CAPTIONS

Place figures and tables at the top or bottom of the appropriate column or columns, on the same page as the relevant text (see Figure ??). A figure or table may extend across both columns to a maximum width of 17.78 cm (7 in.).

Captions should be Times New Roman or Times Roman 9-point bold. They should be numbered (e.g., “Table 1” or “Figure ??”), centered (if one line) otherwise justified, and placed

beneath the figure or table. Please note that the words “Figure” and “Table” should be spelled out (e.g., “Figure” rather than “Fig.”) wherever they occur. Figures, like Figure ??, may span columns and all figures should also include alt text for improved accessibility. Papers and notes may use color figures, which are included in the page limit; the figures must be usable when printed in black-and-white in the proceedings.

The paper may be accompanied by a short video figure (we recommend staying within five minutes in length). However, the paper should stand on its own without the video figure, as the video may not be available to everyone who reads the paper.

### 6.1 Inserting Images

When possible, include a vector formatted graphic (i.e. PDF or EPS). When including bitmaps, use an image editing tool to resize the image at the appropriate printing resolution (usually 300 dpi).

## 7. QUOTATIONS

Quotations may be italicized when “*placed inline*”.

Longer quotes, when placed in their own paragraph, need not be italicized or in quotation marks when indented.

## 8. LANGUAGE, STYLE, AND CONTENT

The written and spoken language of SIGCHI is English. Spelling and punctuation may use any dialect of English (e.g., British, Canadian, US, etc.) provided this is done consistently. Hyphenation is optional. To ensure suitability for an international audience, please pay attention to the following:

- Write in a straightforward style.
- Try to avoid long or complex sentence structures.
- Use common and basic vocabulary (e.g., use the word “unusual” rather than the word “arcane”).
- Briefly define or explain all technical terms that may be unfamiliar to readers.
- Explain all acronyms the first time they are used in your text—e.g., “Digital Signal Processing (DSP)”.
- Explain local references (e.g., not everyone knows all city names in a particular country).
- Explain “insider” comments. Ensure that your whole audience understands any reference whose meaning you do not describe (e.g., do not assume that everyone has used a Macintosh or a particular application).
- Explain colloquial language and puns. Understanding phrases like “red herring” may require a local knowledge of English. Humor and irony are difficult to translate.
- Use unambiguous forms for culturally localized concepts, such as times, dates, currencies, and numbers (e.g., “1–5–97” or “5/1/97” may mean 5 January or 1 May, and “seven o’clock” may mean 7:00 am or 19:00). For currencies, indicate equivalences: “Participants were paid ¥ 25,000, or roughly US \$22.”
- Be careful with the use of gender-specific pronouns (he, she) and other gendered words (chairman, manpower, man-months). Use inclusive language that is gender-neutral

(e.g., she or he, they, s/he, chair, staff, staff-hours, person-years). See the *Guidelines for Bias-Free Writing* for further advice and examples regarding gender and other personal attributes [?]. Be particularly aware of considerations around writing about people with disabilities.

- If possible, use the full (extended) alphabetic character set for names of persons, institutions, and places (e.g., Grøn-bæk, Lafrenière, Sánchez, Nguyễn, Universität, Weißenbach, Züllighoven, Århus, etc.). These characters are already included in most versions and variants of Times, Helvetica, and Arial fonts.

## 9. ACCESSIBILITY

The Executive Council of SIGCHI has committed to making SIGCHI conferences more inclusive for researchers, practitioners, and educators with disabilities. As a part of this goal, the all authors are asked to work on improving the accessibility of their submissions. Specifically, we encourage authors to carry out the following five steps:

1. Add alternative text to all figures
2. Mark table headings
3. Add tags to the PDF
4. Verify the default language
5. Set the tab order to “Use Document Structure”

For more information and links to instructions and resources, please see: <http://chi2016.acm.org/accessibility>. The `\hyperref` package allows you to create well tagged PDF files, please see the preamble of this template for an example.

## 10. PAGE NUMBERING, HEADERS AND FOOTERS

Your final submission should not contain footer or header information at the top or bottom of each page. Specifically, your final submission should not include page numbers. Initial submissions may include page numbers, but these must be removed for camera-ready. Page numbers will be added to the PDF when the proceedings are assembled.

## 11. PRODUCING AND TESTING PDF FILES

We recommend that you produce a PDF version of your submission well before the final deadline. Your PDF file must be ACM DL Compliant. The requirements for an ACM Compliant PDF are available at: <http://www.scomminc.com/pp/acmsig/ACM-DL-pdfs-requirements.htm>.

Test your PDF file by viewing or printing it with the same software we will use when we receive it, Adobe Acrobat Reader Version 10. This is widely available at no cost. Note that most reviewers will use a North American/European version of Acrobat reader, so please check your PDF accordingly.

## 12. CONCLUSION

It is important that you write for the SIGCHI audience. Please read previous years’ proceedings to understand the writing style and conventions that successful authors have used. It is particularly important that you state clearly what you have done, not merely what you plan to do, and explain how your work is different from previously published work, i.e., the unique contribution that your work makes to the field. Please consider what the reader will learn from your submission, and how they will find your work useful. If you write with these

questions in mind, your work is more likely to be successful, both in being accepted into the conference, and in influencing the work of our field.

## 13. ACKNOWLEDGMENTS

Sample text: We thank all the volunteers, and all publications support and staff, who wrote and provided helpful comments on previous versions of this document. Authors 1, 2, and 3 gratefully acknowledge the grant from NSF (#1234–2012–ABC). *This whole paragraph is just an example.*

## 14. REFERENCES FORMAT

Your references should be published materials accessible to the public. Internal technical reports may be cited only if they are easily accessible and may be obtained by any reader for a nominal fee. Proprietary information may not be cited. Private communications should be acknowledged in the main text, not referenced (e.g., [Golovchinsky, personal communication]). References must be the same font size as other body text. References should be in alphabetical order by last name of first author. Use a numbered list of references at the end of the article, ordered alphabetically by last name of first author, and referenced by numbers in brackets. For papers from conference proceedings, include the title of the paper and the name of the conference. Do not include the location of the conference or the exact date; do include the page numbers if available.

References should be in ACM citation format: [http://www.acm.org/publications/submissions/latex\\_style](http://www.acm.org/publications/submissions/latex_style). This includes citations to Internet resources [?, ?, ?] according to ACM format, although it is often appropriate to include URLs directly in the text, as above. Example reference formatting for individual journal articles [?], articles in conference proceedings [?], books [?], theses [?], book chapters [?], an entire journal issue [?], websites [?, ?], tweets [?], patents [?], games [?], and online videos [?] is given here. See the examples of citations at the end of this document and in the accompanying BibTeX document. This formatting is a edited version of the format automatically generated by the ACM Digital Library (<http://dl.acm.org>) as “ACM Ref.” DOI and/or URL links are optional but encouraged as are full first names. Note that the Hyperlink style used throughout this document uses blue links; however, URLs in the references section may optionally appear in black.