Codeless Game Construction
Using Construct 2 or 3

Building
Tower Defense
Games

Creating "Innovative" TD Game Mechanics

By Stephen Gose

Building Tower Defense Games

Codeless Game Construction using Construct2 & Construct3

Stephen Gose

This book is available at https://leanpub.com/cgc-c23-towerdefense

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Preface

Distribution Permission

Supporting website: https://makingbrowsergames.com/

Forewords

by Terry Paton: — "Copying or imitating is an awesome way to learn how to do something, traditional artists have done it for centuries. This practice was generally considered a tribute, *not a forgery*, — **If you want to get better at something, then try to do it like those who've already mastered it.** Look at the choices they have made and consider why they made those decisions, often important things are hidden in subtlety and the only way we learn those subtleties is by creating the same thing. The balance here is "stealing" versus "inspiration". **"Ripping off" ideas from someone else in a way that harms their hard work as compared to producing something that was "inspired by" their work.** If you plan on publicly releasing something, I recommend you should inject some of your own vision into any game you make, take a concept but then extend or change it to create something of your own."

Disclosures

- I refer to "Construct 2" under the **moniker of "C2"** and **Construct 3** as **"C3"** to distinguish it as a clear demarcation between the versions.
- **Stephen Gose LLC reserves the right, at any time and without notice, to change modify, or correct the information contained in this publication.**

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- All websites listed herein **are accurate at the time of publication but may change in the future or cease to exist.** It is best to research these "dead websites" links in **"The WayBack Machine"**. The listing of website references and resources does not imply my endorsement of any site's entire contents.

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CONSTRUCT 2 — End-of-Life

July 1st, 2020, Construct 2 reached the "end-of-life" product cycle (e.g.: "taken off sale") and was no longer available for new purchases. On July 1st, 2021, Construct 2 was fully retired. This means that:

- No further Construct 2 releases are made.
- No official Construct 2 support will be provided — except for email support regarding **any historical payment or license issues.**
- No further official `NW.js` updates will be issued for Construct 2.
- ***All existing valid Construct 2 licenses will continue to work indefinitely.*** You will still be able to use the full features of Construct 2 ***if you've purchased*** it in the past - it is only continuing support and updates that will stop. Bear in mind though that if changes in other software (e.g.: ***Safari browser***) impact Construct 2 features to stop working, no further updates will be forthcoming.
- ***The online manual and tutorials will remain available.***
- The Construct2-related forums will remain accessible (but will be collapsed into a sub-category in the main forum list).

Workbook Content

This tutorial workbook is written in a fun, friendly, conversational style with example project(s) and numerous open-ended exercises that **encourage you** to include your bespoke artwork assets and features. When you finish this workbook, you should have *your very own finished bespoke game — not just a mirror copy of mine* — provided that you follow the exercises and guidelines. It's not exclusive to only the Construct Gaming Framework family; *this content can apply to any JS Gaming Framework.*

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> About this Workbook

This workbook **is a guide** to **Construct Gaming Framework**, and an intermediate-level guide to **PHP Server-side game development**, **WebSockets,** efficient **JavaScript programming fundamentals**, and game design's **"best practices"**. (see Appendix: "JS OLOO for Modern Game Development Method") I assume you (the reader) **already know some of these technologies.** If not, then a few hours spent on **W3Schools** can quickly remedy any deficiency and earn valuable certifications. **The workshop instructor's packaged edition** includes PowerPoint slides with lecture references available only from **LeanPub.com**.

This edition reveals different production methods which I call the **Game Design System**™ — in which, we'll create **Game Recipes™** for specific "Game Mechanics". This workbook provides simple-to-follow worksheets, step-by-step instructions, and a straightforward approach to building specific Game Mechanics **from Construct components** using my **Game Design System™** methods discussed in the supporting **"Code-less Game Construction"** series.

Expert game developers understand the "Don't Repeat Yourself" (D.R.Y.) concept, yet few have taken a step back to the "10,000-foot view" on their own game production pipelines. We'll do that aerial view in this book at first, and then, as we follow this game's development, we'll **"nose dive head-first"** directly into those controlling events that **breathe life** into this **"Game Mechanics".** I believe you will be surprised how quickly, and easily, we can build games using the **Game Design System™** and its **Game Recipes™.** But more importantly, how quickly you can "construct" an entire gaming series.

> How to Read & Use this workbook:

Start by reading — or skimming through — the **Introduction Section,** so that together, we are speaking the same "game references" and terminologies. Then, select the Construct version that interests you and begin your bespoke game project development. C3 can load and run any C2 project with only a few extreme exceptions concerning plugins. **I don't use any plugins other than those native to Construct.** You could begin your game studio products using C2, start selling your product line, and then once revenues are coming in, subscribe to C3.

Here are the topics in this edition:

- Game creation for this Game Mechanics in both Construct2 (C2) and Construct3 (C3).
- How to integrate these "Game Mechanics" with other "Gaming Genres" — for example, "Hidden Objects", "Tower Defense", and varied Combat Systems!

- Deploy games as either a "Content Management System" (CMS), a "Progressive Web Application" (PWA), or a "Single Web-Page Application" (SWPA) for any device.
- Analyze the **current market demand** for this specific Game Mechanics and Game Genre, **where** and **how** to deploy it.
- Automatically generate various game board environment themes.
- ***Instructor Guides and teaching resources are available for workshops in the Teacher's edition with online course content.***
- Where to find and Access ***several online courses*** included with this book.
- **Coding Style Appendix:** sections dedicated to interested ***Senior Programming Engineers*** and the ***rationale on why and how*** migration **away from classical OOP** to OLOO compositions is important.
- **"The Deeper Dive"** sections for interested Software Engineers concerning Construct Gaming Framework.
- Each ***Part*** contains several sub-sections. The workbook starts with an "Introduction Overview" into the goals, game ludology, and generation tools. In a matter of minutes, you will have a working game prototype for this Game's Mechanics. All that remains to do is to **add your own artwork and additional game features;** after a few days, you'll have a completed game ready to deploy to any "apps" store.
- You'll find detailed working examples, with dozens of illustrations and many concepts you can freely apply to your own gaming projects.
- All the source code is externally linked and annotated with enhanced explanations.

> Viewing the eBook:

This book includes programming code that is optimally viewed ***in single-column landscape mode,*** and you should adjust the font size to a comfortable setting.

> External Links

I've ***"gone to great lengths"*** to make this book "skim-friendly" ***— even for my International customers*** by emphasizing important concepts ***in bold font type.*** I have provided links to ***(American) "English Jargon phrases"*** that will help translate this content directly into your native language. I use "Notes", "Tips", "Warning", and "Best Practices" icons to encapsulate those ancillary topics for your further education from **other experts** in the gaming industry.

The Internet is a living, dynamic information resource ***that doubles every 35 days!*** There are **several reasons** this book **points to external content** … because —

1. It provides you with the "research path" I took to present and develop my ideas. It takes all the guesswork out of it and conserves your research time and efforts. It saves you 100s of hours of your personal time searching for supporting facts and opinions.
2. It avoids copyright infringements and **provides the required acknowledgments** to all those "Open-source authors" for their contributions and use of their resources under **these various licenses and EULA.**
3. It provides external authors the opportunity ***to recant (or update) their published content.*** Technology is a fast-moving target, and what was once "cutting edge" soon becomes obsolete. For example, the use of **"window.onload"** was recanted by its originator back in 2014 as an unsafe method for launching browser applications.
4. Finally, and most importantly, it **reduces your initial purchase price** from the reams of "padded source code content" **— don't make me embarrass those authors who do this** and sell their books with 90% source code double-spaced — while keeping your investment in this book's information **"fresh".** This book would be ***double the size and triple the price*** if I had embedded all of the source code as others do.

You'll find your ***Bonus content, source code, and references*** —

- in the footnotes links,
- external reference links, and in **the various linked files** which are available directly from my supporting website — without registration nor logon thus keeping your personal information safe!
- **or** from the latest edition updates found in your **LeanPub.com personal library** (assuming that you purchased this copy as a LeanPub patron).

All the source code is provided as Construct project files and **"pure"** JavaScript (JS) — it doesn't use any additional "abstraction layers" such as "TypeScript", "CoffeeScript", or "JQuery" for obvious reasons.

I assume that many readers will want to use this book to quickly build their ***bespoke*** game projects. So, I've included reference examples to other similar game examples, gaming engines, frameworks, ***GUI game kits***, indie developers, authors, their "open-source" contributions, articles, books, ***artwork***, application tools, and their wisdom. You'll soon discover why I do this …

> References Used

This workbook is a derivative work and transpiled from a single chapter of a larger collection of 16+ Game Mechanics and 19 sub-genres for the ***Phaser JS Gaming***

Framework found on ***https://leanpub.com/pgskc/.*** It is also available as a single chapter in the upcoming ***Construct Game Starter Kit Collection***. You'll also discover how similar Flash AS2/3 code is to JavaScript.

- ***Construct Game Starter Kit Collection*** — in pdf or epub from **LeanPub.com** and "hardback editions" from Amazon
- ***Construct2 Official Online Manual***
- ***C2 Addon SDK Online Documentation***
- ***Construct2 JavaScript SDK Documentation***
- ***Construct3 Online Manual***
- ***C3 Addon SDK Online Documentation***

Your newly obtained skills ...

By the end of this workbook, you'll have integrated into your own **_bespoke_** game design:

- **_Built "future-proof" and flexible game architecture._**
- Used the **Game Design System™** to create **_Game Recipes™_** from the Construct tools.
- Adopted processes for software project management using "**agile development**".
- Imported resources and game assets;
- Displayed, animated, and moved sprite objects on various scene layouts and layers;
- Incorporated "**_sound effects_**" (abbreviated as **_sfx or "ChipTones"_**) and theme music across various game scenes;
- Deployed "heads-up display" (HUD) on game scenes both inside and outside the canvas;
- Used customized web fonts;
- Incorporated multiple user interfaces (touch, multi-touch, accelerometer, mouse, and keyboard);
- Created and managed various Game Phases for CMS, SPWA, & PWA;
- Managed permanent game artwork, and assets across this game series;
- Optimized your games for various user **_IoT gaming devices_**;
- Integrated several 3rd-party scripts and services.

More Resources

"Game Recipe™" Courses (purchased separately on specific Gaming Mechanics) using the **Game Design System™ management method and concepts.** These courses enhance your skills and are available from my educational websites hosted by **_LeanPub.com_** or **_Training By Blackboard, Books, and Browsers_**.

You can earn your **Game Development Certifications** from **_my online courses_**, **_or (my personal favorite!) Zenva_**; to enhance your resume. See the growing catalog of courses for **_college credit, home-schooling, or personal skills development_** at **_Training by Blackboard, Books & Browsers_**

Programming Courses

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- ***Using JavaScript OLOO in game development*** — Abandon OOP for Composition Game Development.
- ***Codeless Game Design Workshop*** — Game Development Course using Construct 2 & 3 Gaming Frameworks. Instructor presentation materials included.

Making *"Innovative"* TD Games

Rulers of Renown™ Gaming Series

ⓘ *Use your purchased workbook's invoice number for each Game's License. Register your "invoice number here" to activate your affiliate commissions.*

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6.1 *Required TD Foundation*

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> Event #1 "On start of layout"

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> Events #2 To #9 — AIBot controller

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> Historical References

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8.2 Gameplay Layout

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> User Interface (UI)

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> Background Theme

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8.3 Gameplay Event Sheet

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> Global Variables

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> Event #1 "On start of layout"

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> Events #3 To #23 AIBot Controller

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> Event #25 To #37 AI CSA Fire Control

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> Event #41 To #51 User Interface (Taps & Clicks)

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> Event #52 To #60 User Interface (roll-overs)

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> Event #61 To #76 Supporting Functions

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8.4 Comparing your code

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9. *"Maginot Line Defense™"*

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9.1 Design Considerations — *"Bi-directional"* TD

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> *Prohibited* Gaming Symbols & Icons

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/cgc-c23-towerdefense.

> Historical References

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/cgc-c23-towerdefense.

> Published *"Wargame"* References

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9.2 Game Flow Sequence & Layouts

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> User Interface (UI)

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> Background Theme

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9.3 Gameplay Event Sheet

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> Global Variables

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> Event #1 "On start of layout"

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> Event #2 "Game Exit" (Quit!)

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> Events #3 to #77 — Game Mechanics (GM) Groups

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> Events #3 to #22 — AIBot Controller

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> Optional Behavior Design for German Regiments!

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> Events #23 to #29 — AIBot Fire Control

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> Events #40 to #42 — AIBot Panzer Combat Control

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> Events #43 to #53 — UI Taps & Clicks

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> Events #54 to #62 — UI Touch & Roll-over

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> Events #63 to #77 — Supporting Functions

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9.4 Comparing your code

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10. *"Helm's Deep"* — Lord of the Rings!

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10.1 Design Considerations

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> Published References

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> Published Games

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/cgc-c23-towerdefense.

> Terrain Features and Battle's Timeline

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> *Additional Innovations …*

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10.2 Gameplay Layout

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> User Interface (UI)

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> Background Theme

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10.3 Gameplay Event Sheet

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> Global Variables

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> Overview of "Game Mechanics" (GM) Groups

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> Event #1 to #3 — "On start of layout"

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> Events #4 to #8 — Saruman's Berserk Bomber

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> Events #9 to #16 — King Théoden's Sortie

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> Events #17 to #23 — Gandalf & Rohirrim Cavalry

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> Events #25 to #35 — (Optional) Dunlendings Regiments

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> Events #36 to #38 — Saruman's Regiments Generation

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> Events #39 to #42 — AI Missile Fire Control

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> Events #58 to #68 — UI Taps & Clicks

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> **Events #69 to #77 — UI Touch & Roll-over**

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10.4 Comparing your code

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11. *"ANTI"* Tower Defense

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11.1 Design Considerations

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> Target Audience

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> Basic Foundation Structure

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> Game Perspectives

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> Gameboard *"Maze"*

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> Artwork & Animation

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11.2 Gameplay Sequence & Layouts

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11.3 Game Mechanics (GM) Data Structure

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> Deeper Dive: How *"MT"* works ...

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> Design Option — *Reducing Memory Footprint*

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11.4 Layout *"Encounters"* — Prototype Combat Engines

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11.5 User Interface (UI)

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11.6 Background Theme

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11.7 Event Sheets

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> Main Menu — *"CMS > es_MainMenu"*

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> Play — *"es_Play"*

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>> Event #1 "On start of layout"

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>> Event #7 to 10 "Partial Movement Table" *(MT)*

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> Travel Corridor — *"es_travelCorridors"*

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> ### *Licensed Maze IGM — "`es_dynaSQGrid`"*

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> ### Final Encounter — "`es_finalEnc`"

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11.8 Comparing your code

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Starting *Your Game Studio!*

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12. One "GM" to Rule them all!

This content is not available in the sample book. The book can be purchased on Leanpub at https://leanpub.com/cgc-c23-towerdefense.

13. Capstone "*Practicum*"

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13.1 *Reality Themes!*

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13.2 *Historical* Themes!

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> "*Battle of Little Big Horn*" — aka "Custer's Last Stand"

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> "Luftwaffe" Raids

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> Battle of the Bulge

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> Napoleon at *"Borodino"*

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> Napoleon at *"Waterloo"*

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> Battle of Agincourt

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> Battle of the Alamo

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13.3 Fantasy Themes

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> Chronicles of Narnia — The Last Battle

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> Battle of the Five Armies (Lord of the Rings)

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13.4 ANTI-Tower Defense Themes

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> Death Star (Star Wars)

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14. What's next?

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14.1 Game Distribution & Marketing

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14.2 Introduction: 8-Step Deployment Method.

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14.3 Port to a Console

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14.4 Selling Directly — The Advantages

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14.5 Book Review Protocol

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14.6 Tell the world about *your* game!

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15. Conclusion

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Appendix — Reviving *Former TD Games*

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Atari's Ramparts (circa. 1990)

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My Construct Version ...

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Desktop Tower Defense

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My Construct Version ...

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Flash Elements TD

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Construct's *"Elements TD"* Version

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