pyproject.toml, packaging, and you

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Acknowledgement of Country

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Ancestral homeland of the Ramaytush Ohlone people

What is TOML?

Semantics:

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Semantics: JSON + date + float vs. integer

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Semantics: JSON + date + float vs. integer
Syntax: more editable than JSON, easier to parse than YAML

TOML example

```
toml_stuff = """\
[project] # Table -> Dictionary
name = "orbipatch"
authors = [ # Array -> List
# Key/Value -> Dictionary
{ name = "MZ", email = "mz@devskillup.com" }
]
"""
```

TOML example

```
import tomli  # tomllib in Python 3.11+
import json
print(json.dumps(
    tomli.loads(toml_stuff),
    indent=4,
))
{
    "project": {
        "name": "orbipatch",
        "authors": [
            {
                "name": "MZ",
                "email": "mz@devskillup.com"
            }
        ]
    }
}
```

pyproject.toml

Originally: Configure build system,

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Originally: Configure build system, experimenting with alternatives, setuptools plugins, etc.
Now: Still that but also: build-system agnostic metadata, configure ecosystem tools.

Parsing pyproject.toml

```python
parsed = tomli.loads(minimal_pyproject)
print(
    "Build system requires:",
    parsed["build-system"].pop("requires")
)

Build system requires: ['setuptool']
```

Parsing pyproject.toml

```python
print(
    "Build backend",
    parsed["build-system"].pop("build-backend")
)
```

Build backend setuptools.build_meta

Parsing pyproject.toml

```
print(
    "Project authors:\n",
    parsed["project"].pop("authors")
)

Project authors:
 [{'name': 'MZ', 'email': 'mz@devskillup.com'}]
```

Parsing pyproject.toml

```python
print(
    "Project description:\n",
    parsed["project"].pop("description"),
)
```

```
Project description:
 silly project named after a niche math thing
```

Parsing pyproject.toml

```python
print(
    "Project:\n",
    json.dumps(parsed.pop("project"), indent=2),
)
```

```
Project:
 {
  "name": "orbipatch",
  "version": "2022.3.6.2",
  "readme": "README.rst"
}
```

build system

requires:

build system

requires: Dependencies

build system

requires: Dependencies
backend:

build system

requires: Dependencies
backend: Module that has the right methods

project

Must:

project

Must: name, version

project

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Recommended:

project

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project

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(usually from file), License (usually from file, can be inlined),

project

Must: name, version
Recommended: Short description (usually inline), Long description
(usually from file), License (usually from file, can be inlined), URLs
(especially "Homepage")

The tools section

Under "tool.NAME"

```
# [tool.black]
# include = '\.pyi'
print(
    "Black configuration:",
    parsed["tool"]["black"],
)

Black configuration: {'include': '\\.pyi'}
```

Configuring coverage

Like with setup.cfg, with prefix "tool.":

```python
# [tool.coverage.run]
# branch = true
print(
    "Coverage configuration:",
    parsed["tool"]["coverage"],
)
```

```
Coverage configuration: {'run': {'branch': True}}
```

Configuring isort

Like with setup.cfg, with prefix "tool.":

```
# [tool.isort]
# src_paths = ["isort", "test"]
print(
    "isort configuration:\n",
    parsed["tool"]["isort"],
)

isort configuration:
 {'src_paths': ['isort', 'test']}
```

project metadata

project section:

project metadata

project section: packaging semantics edition

Configuring dependencies

```
# [project]
# ...
# dependencies = ["six"]
print(
    "dependencies:",
    parsed["project"]["dependencies"],
)
```

Configuring optional dependencies

```
# [project.optional-dependencies]
# tests = ["pytest"]
# docs = ["sphinx"]
print(
    "Optional dependencies:\n",
    parsed["project"]["optional-dependencies"],
)

Optional dependencies:
 {'tests': ['pytest'], 'docs': ['sphinx']}
```

Configuring console scripts

```
# [project.scripts]
# awesome-command = "my_package:main"
print(
    "scripts:",
    parsed["project"]["scripts"],
)

scripts: {'awesome-command': 'my_package:main'}
```

Configuring entry points

```
#[project.entry-points."paste.app_factory"]
# main = "my-package:main"
print(
    "entry points:\n",
    parsed["project"]["entry-points"],
)

entry points:
 {'paste.app_factory': {'main': 'my-package:main'}}
```

Build system

Requires:

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Build system: PEP 517:

```python
def build_wheel(
    wheel_directory,
    config_settings=None,
    metadata_directory=None,
):
    ...
```

python -m build

Usually:

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Usually: Just works

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python -m build

Usually: Just works
Hint: Use "src/" structure
Sometimes: BETA! "tools.setup.¡something¿"

Editable installs

Empty setup.cfg needed

Editable installs

Empty setup.cfg needed (right now)

Dynamic fields

```
# [project]
# name = "orbipatch"
# dynamic = ["version"]
print(
    "name",
    parsed["project"].pop("name"),
)
print(
    "project",
    parsed["project"],
)

name orbipatch
project {'dynamic': ['version']}
```

setuptools scm

```
# [build-system]
# requires = [
#   "setuptools",
#   "setuptools_scm",
# ]
#
# [project]
# name = "orbipatch"
# dynamic = ["version"]
```

pyproject.toml

Packaging!

pyproject.toml

Packaging!
Also: Everything else

pyproject.toml

Packaging!
Also: Everything else
Support in your own tooling

project fields

Name

project fields

Name
Version

project fields

Name
Version
Description, license, readme

project fields

Name
Version
Description, license, readme
Dependencies (and Optional dependencies)

project fields

Name
Version
Description, license, readme
Dependencies (and Optional dependencies)
Scripts

project fields

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Entry points

setuptools support

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"python -m build" future-proofing