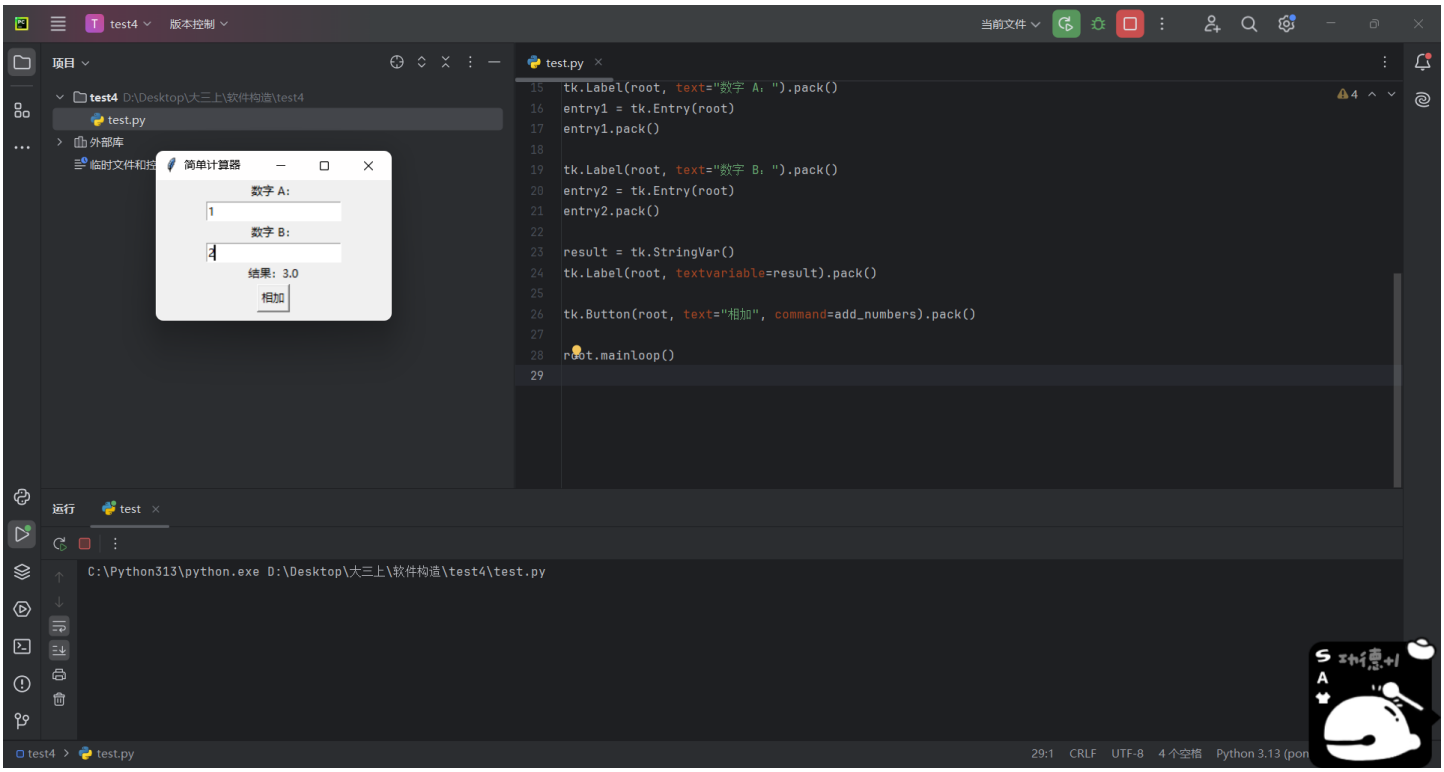
软件构造第六章作业

5. **测试一个软件可以分成哪些阶段？每个阶段的主要测试内容是什么？**

- **单元测试：**验证软件最小可测试单元（函数、类、模块）的正确性
  - 函数或方法的输入输出是否正确
  - 分支、循环逻辑是否按预期运行
  - 异常处理是否正确
  - 边界条件、特殊情况是否正确处理
  - Mock外部依赖，检查模块内部逻辑是否可靠
- **集成测试：**验证多个模块之间的接口与协同工作是否正确
  - 模块之间的接口数据传递是否正确
  - 依赖关系是否正常（数据库、API、第三方服务等）
  - 模块集成后整体功能是否异常
  - 集成顺序可能导致的问题（自底向上集成、自顶向下集成、混合方式）
- **系统测试：**在完整软件系统上从整体角度验证功能和性能
  - **功能测试**
    - 系统各功能是否符合需求规格说明
    - 流程是否通畅、操作是否符合用户预期
    - 业务场景测试
  - **非功能测试**
    - 性能测试（负载、压力、并发）
    - 安全测试（权限、注入、越权等）
    - 兼容性测试（不同系统、浏览器、设备）
    - 易用性测试（UI/UX）
    - 安装部署与恢复测试
- **验收测试：**由客户或最终用户验证软件是否满足业务需求
  - 按需求文档验证是否满足业务目标
  - 全流程业务场景测试
  - 用户体验是否达到预期

- 数据准确性与业务逻辑正确性
- 系统实际环境的运行检查

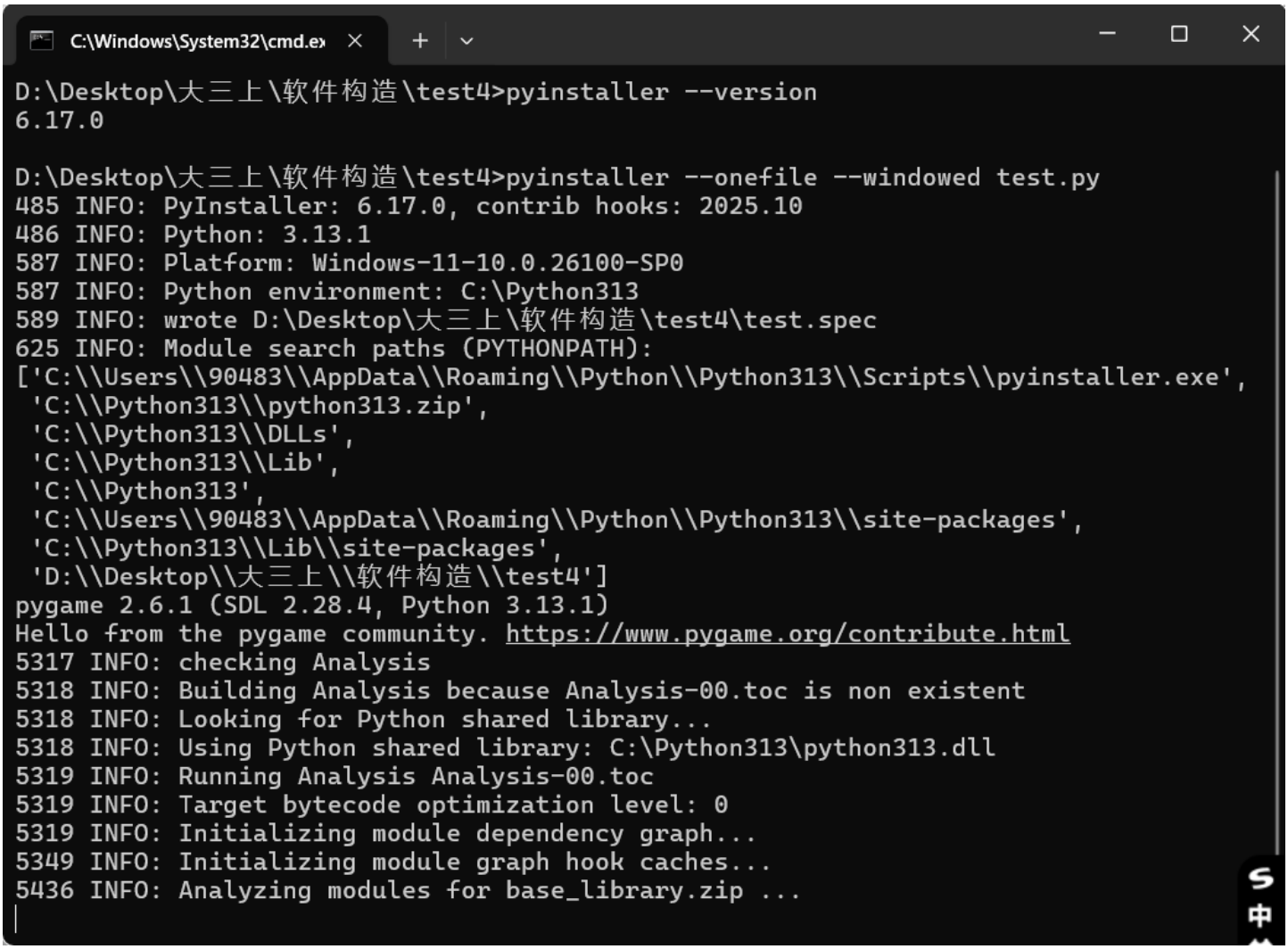
15. 程序如图

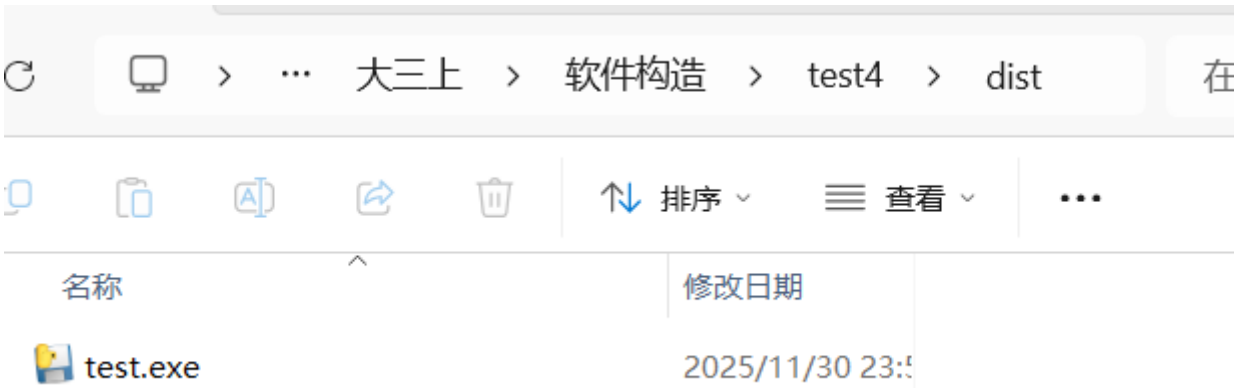


结构

生成exe

```
PS D:\Desktop\大三上\软件构造\test4> pip install pyinstaller
Defaulting to user installation because normal site-packages is not writeable
Looking in indexes: https://pypi.tuna.tsinghua.edu.cn/simple
Collecting pyinstaller
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/2d/f5/6a122efe024433ecc34aab6f499e0bd2bbe059c639b77b0045aa2421b0bf/pyinstaller-6.17.0-py3-none-win_amd64.whl (1.4 MB)
     ━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━━ 1.4/1.4 MB 502.2 kB/s eta 0:00:00
Collecting altgraph (from pyinstaller)
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/a9/ba/000a1996d4308bc65120167c21241a3b205464a2e0b58deda26ae8ac21d1/altgraph-0.17.5-py2.py3-none-any.whl (21 kB)
Requirement already satisfied: packaging>=22.0 in c:\users\90483\appdata\roaming\python\python313\site-packages (from pyinstaller) (25.0)
Collecting pefile>=2022.5.30 (from pyinstaller)
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/54/16/12b82f791c7f50ddec566873d5bdd245baa1491bac11d15ffb98aecc8f8b/pefile-2024.8.26-py3-none-any.whl (74 kB)
Collecting pyinstaller-hooks-contrib>=2025.9 (from pyinstaller)
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/86/de/a7688eed49a1d3df337cdaa4c0d64e231309a52f269850a72051975e3c4a/pyinstaller_hooks_contrib-2025.10-py3-none-any.whl (447
kB)
Collecting pywin32-ctypes>=0.2.1 (from pyinstaller)
  Downloading https://pypi.tuna.tsinghua.edu.cn/packages/de/3d/8161f7711c017e01ac9f008dfddd9410dff3674334c233bde66e7ba65bbf/pywin32_ctypes-0.2.3-py3-none-any.whl (30 kB)
Requirement already satisfied: setuptools>=42.0.0 in c:\users\90483\appdata\roaming\python\python313\site-packages (from pyinstaller) (80.8.0)
Installing collected packages: altgraph, pywin32-ctypes, pyinstaller-hooks-contrib, pefile, pyinstaller
  WARNING: The scripts pyi-archive_viewer.exe, pyi-bindepend.exe, pyi-grab_version.exe, pyi-makespec.exe, pyi-set_version.exe and pyinstaller.exe are installed in 'C:\Users\90483\A
ppData\Roaming\Python\Python313\Scripts' which is not on PATH.
  Consider adding this directory to PATH or, if you prefer to suppress this warning, use --no-warn-script-location.
Successfully installed altgraph-0.17.5 pefile-2024.8.26 pyinstaller-6.17.0 pyinstaller-hooks-contrib-2025.10 pywin32-ctypes-0.2.3
PS D:\Desktop\大三上\软件构造\test4>
```


C:\Windows\System32\cmd.ex
D:\Desktop\大三上\软件构造\test4>pyinstaller --version
6.17.0
D:\Desktop\大三上\软件构造\test4>pyinstaller --onefile --windowed test.py
485 INFO: PyInstaller: 6.17.0, contrib hooks: 2025.10
486 INFO: Python: 3.13.1
587 INFO: Platform: Windows-11-10.0.26100-SP0
587 INFO: Python environment: C:\Python313
589 INFO: wrote D:\Desktop\大三上\软件构造\test4\test.spec
625 INFO: Module search paths (PYTHONPATH):
['C:\\Users\\90483\\AppData\\Roaming\\Python\\Python313\\Scripts\\pyinstaller.exe',
'C:\\Python313\\python313.zip',
'C:\\Python313\\DLLs',
'C:\\Python313\\Lib',
'C:\\Python313',
'C:\\Users\\90483\\AppData\\Roaming\\Python\\Python313\\site-packages',
'C:\\Python313\\Lib\\site-packages',
'D:\\Desktop\\大三上\\软件构造\\test4']
pygame 2.6.1 (SDL 2.28.4, Python 3.13.1)
Hello from the pygame community. https://www.pygame.org/contribute.html
5317 INFO: checking Analysis
5318 INFO: Building Analysis because Analysis-00.toc is non existent
5318 INFO: Looking for Python shared library...
5318 INFO: Using Python shared library: C:\Python313\python313.dll
5319 INFO: Running Analysis Analysis-00.toc
5319 INFO: Target bytecode optimization level: 0
5319 INFO: Initializing module dependency graph...
5349 INFO: Initializing module graph hook caches...
5436 INFO: Analyzing modules for base_library.zip ...


大三上
软件构造
test4
dist
排序
查看
名称
修改日期
test.exe
2025/11/30 23: