Project 1 ROBDD Generation

資訊工程系 二年級 乙班 張皓鈞 B11030202

Build

Use CMake as build tool

```
mkdir build
cd build
cmake -DCMAKE_BUILD_TYPE=Release ..
cmake --build .
```

Test Platform

```
🛅 hao — ~ — -fish — 93×26
) neofetch
                            hao@ip139-200.wlan.ntust.edu.tw
                 Ic.
               , xNMM.
             .OMMMMo
                            OS: macOS 13.5 22G74 arm64
             омммо,
                            Host: MacBookPro17,1
    .;loddo:' loolloddol;.
                            Kernel: 22.6.0
  Uptime: 24 days, 5 hours, 39 mins
 . KMMMMMMMMMMMMMMMMMMWd .
                            Packages: 255 (brew)
 химимимимимимимимимимимимих.
                            Shell: fish 3.6.1
; ммммммммммммммммммммм :
                            Resolution: 1680x1050
: МММММММММММММММММММ :
                            DE: Aqua
. МММММММММММММММММММХ.
                            WM: Quartz Compositor
                            WM Theme: Blue (Light)
 Terminal: Apple_Terminal
 . ХИМИМИМИМИМИМИМИМИМИМИМИМИК.
                            Terminal Font: SFMonoNerdFontComplete-Regular
   CPU: Apple M1
    ; KMMMMMMMWXXWMMMMMMMk.
                            GPU: Apple M1
                            Memory: 2965MiB / 16384MiB
               ., coo:.
      .cooc,.
> |
```

macOS

Darwin ip139-200.wlan.ntust.edu.tw 22.6.0 Darwin Kernel Version 22.6.0: Wed Jul 5 22:22:52 PDT 2023; root:xnu-8796.141.3~6/RELEASE ARM64 T8103 arm64

Apple Clang

```
Apple clang version 14.0.3 (clang-1403.0.22.14.1)
```

Graphviz

```
dot - graphviz version 8.1.0 (20230707.0739)
```

Test Case

Case 1 (4 variables)

$$f(p,q,r,s) = p \land q \land r \land s + p \land q \land \neg r \land s + p \land \neg q \land r \land s \tag{1}$$

Input PLA

examples/case7/input.pla

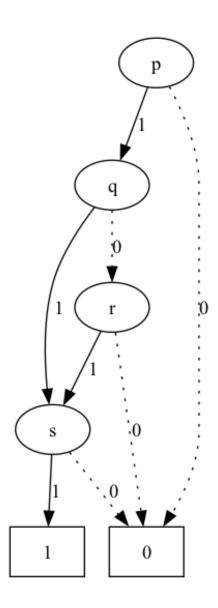
```
.i 4
.o 1
.ilb p q r s
.ob f
.p 3
1111 1
1101 1
1011 1
.e
```

Output DOT

```
digraph ROBDD{
        {rank=same 2}
        {rank=same 4}
        {rank=same 7}
       {rank=same 14}
       0[label=0, shape=box]
       1[label=1, shape=box]
       2[label="p"]
       4[label="q"]
       7[label="r"]
       14[label="s"]
       2->4[label="1", style=solid]
       2->0[label="0", style=dotted]
       4->14[label="1", style=solid]
       4->7[label="0", style=dotted]
       7->14[label="1", style=solid]
       7->0[label="0", style=dotted]
       14->1[label="1", style=solid]
       14->0[label="0", style=dotted]
```

}

Generated PNG



Case 2 (5 variables)

 $f(w,x,y,z,u) = \neg w \wedge x \wedge y \wedge z \wedge u + x \wedge y \wedge \neg z \wedge u + \neg w \wedge x \wedge \neg y \wedge z \wedge u + w \wedge x \wedge y \wedge \neg z \wedge \neg u \quad (2)$

Input PLA

examples/case8/input.pla

```
.i 5
.o 1
.ilb w x y z u
.ob f
.p 4
01111 1
-1101 1
01011 1
11100 1
.e
```

Output DOT

```
digraph ROBDD{
       {rank=same 2}
       {rank=same 3 4}
        {rank=same 6 8}
        {rank=same 11 16}
       {rank=same 22}
       0[label=0, shape=box]
       1[label=1, shape=box]
       2[label="w"]
       3[label="x"]
       4[label="x"]
       6[label="y"]
       8[label="y"]
       11[label="z"]
       16[label="z"]
       22[label="u"]
       2->4[label="1", style=solid]
       2->3[label="0", style=dotted]
       3->6[label="1", style=solid]
       3->0[label="0", style=dotted]
       4->8[label="1", style=solid]
       4->0[label="0", style=dotted]
       6->22[label="1", style=solid]
       6->11[label="0", style=dotted]
       8->16[label="1", style=solid]
       8->0[label="0", style=dotted]
       11->22[label="1", style=solid]
       11->0[label="0", style=dotted]
       16->0[label="1", style=solid]
       16->1[label="0", style=dotted]
       22->1[label="1", style=solid]
       22->0[label="0", style=dotted]
}
```

Generated PNG

