







Making Data-Driven Porting Decisions with Tuscan

Kareem Khazem

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gcc

Compiler

0010



gcc

Compiler

glibc

Standard
Library

0010



gcc

Compiler

glibc

Standard
Library

ld.bfd

Linker

0010



gcc

Compiler

glibc

Standard
Library

ld.bfd

Linker

x86_64

Archi-
tecture

0010



???

Compiler

Standard
Library

Linker

Archi-
tecture

FreeBSD

clang

Compiler

glibc

Standard
Library

LLD

Linker

x86_64

Archi-
tecture

Fuchsia

clang

Compiler

musl

Standard
Library

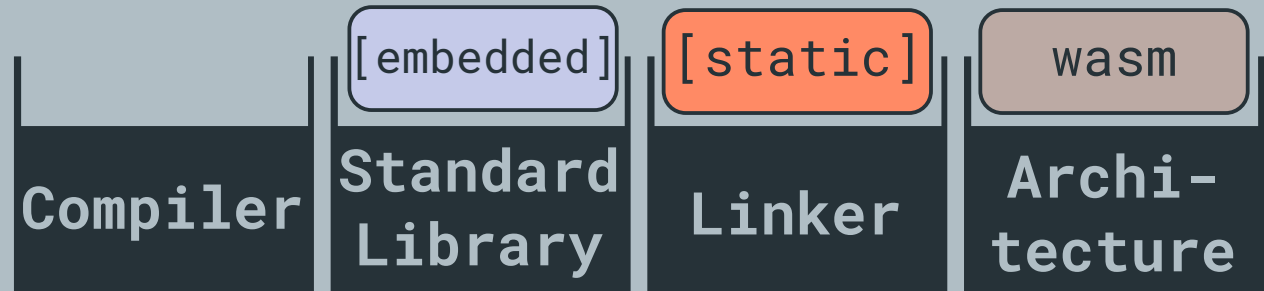
LLD

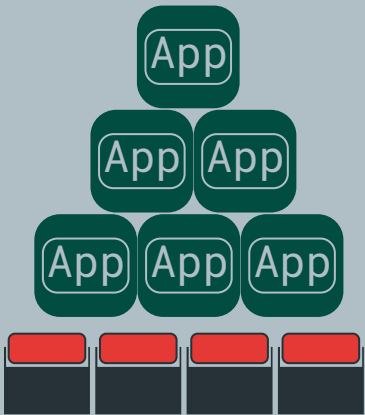
Linker

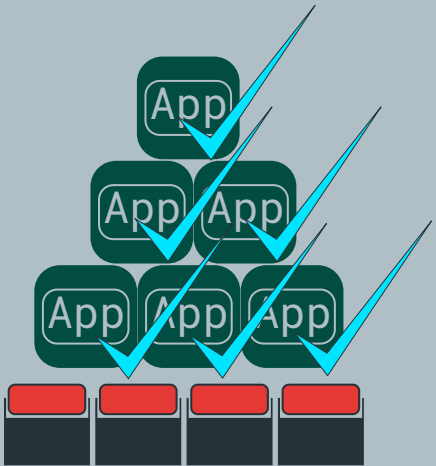
arm64

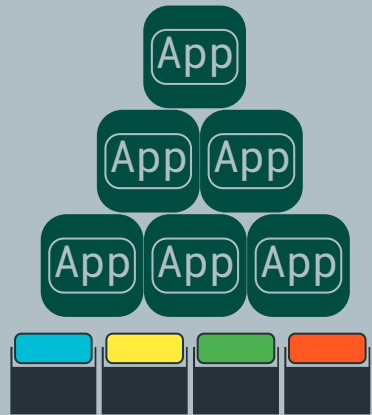
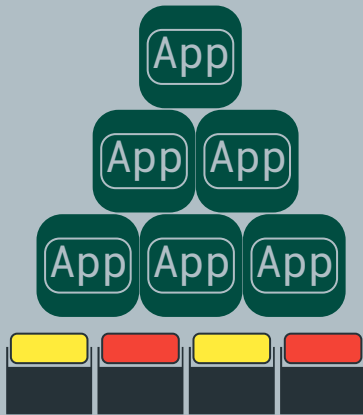
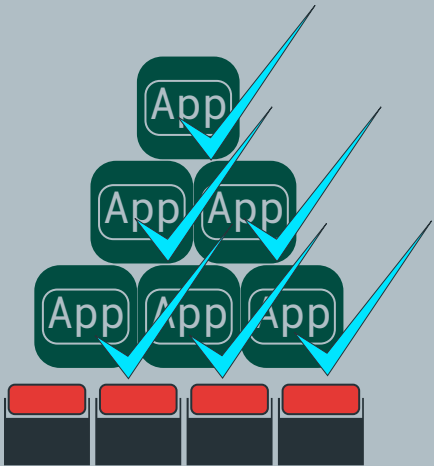
Archi-
tecture

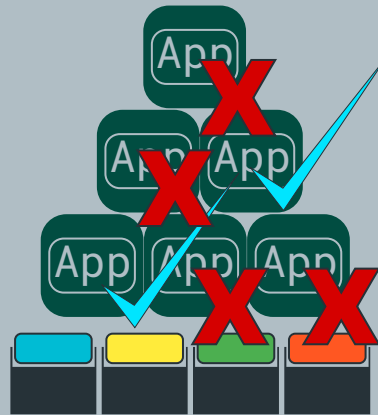
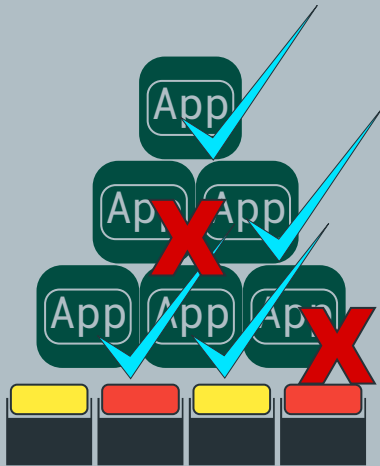
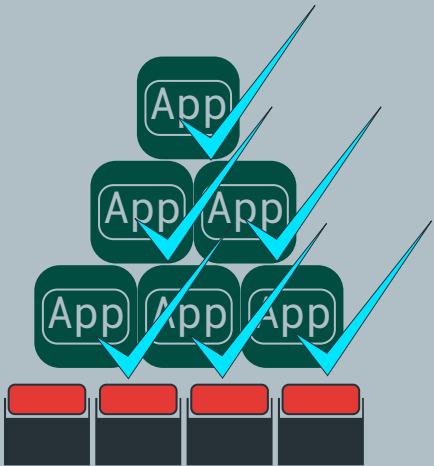
WebAssembly



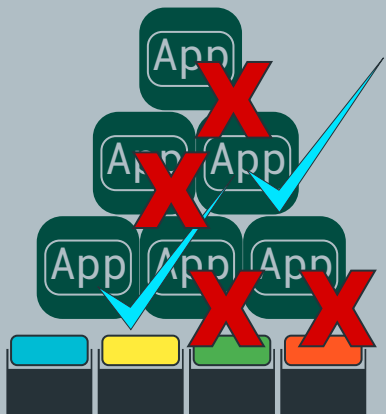








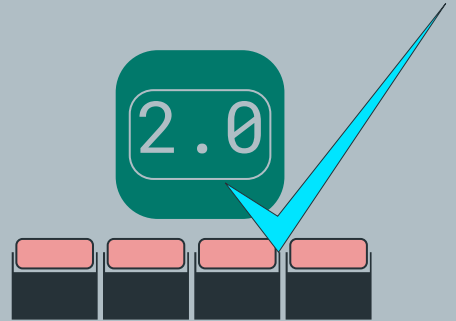
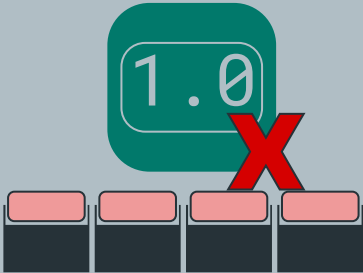
Reproducible



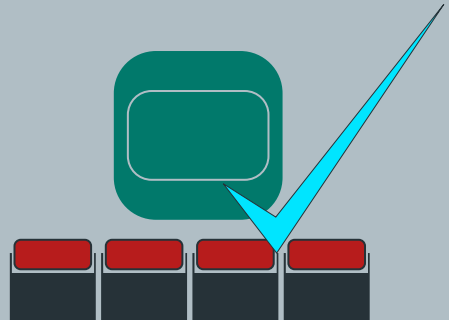
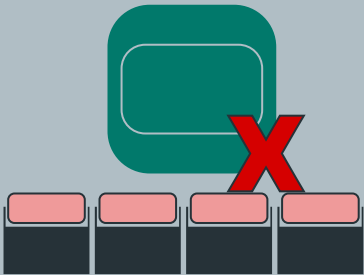
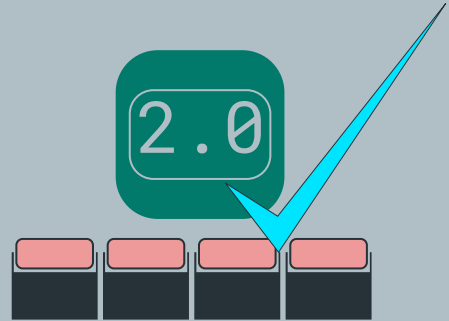
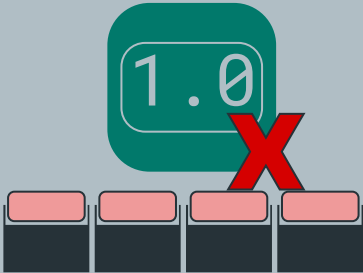
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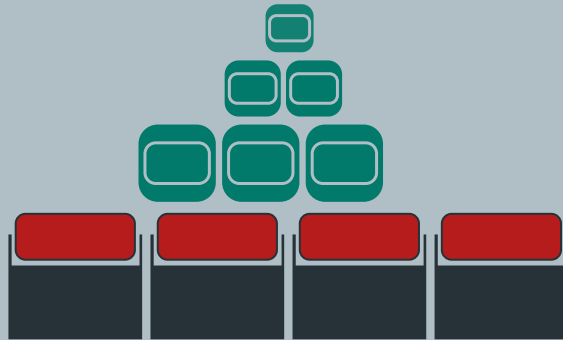
Repeatable



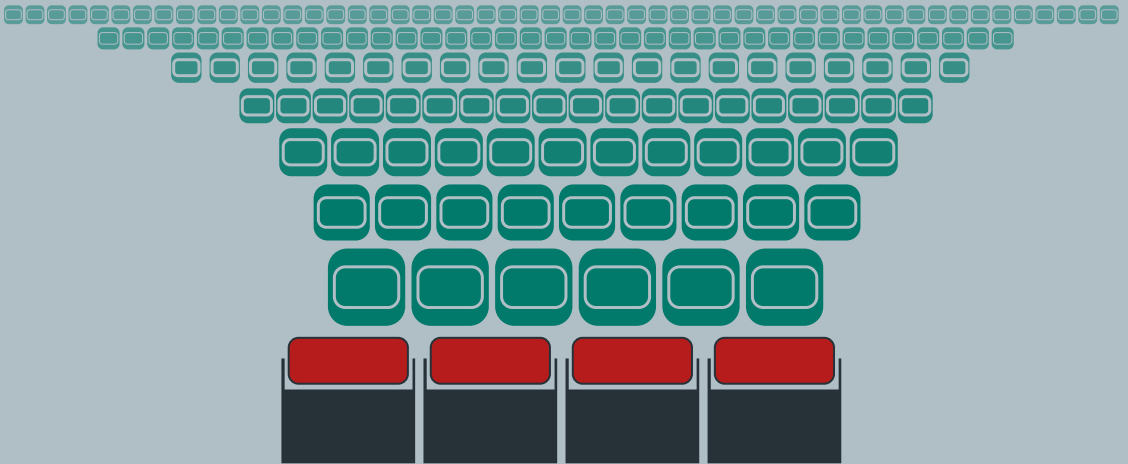
Repeatable



Scalable



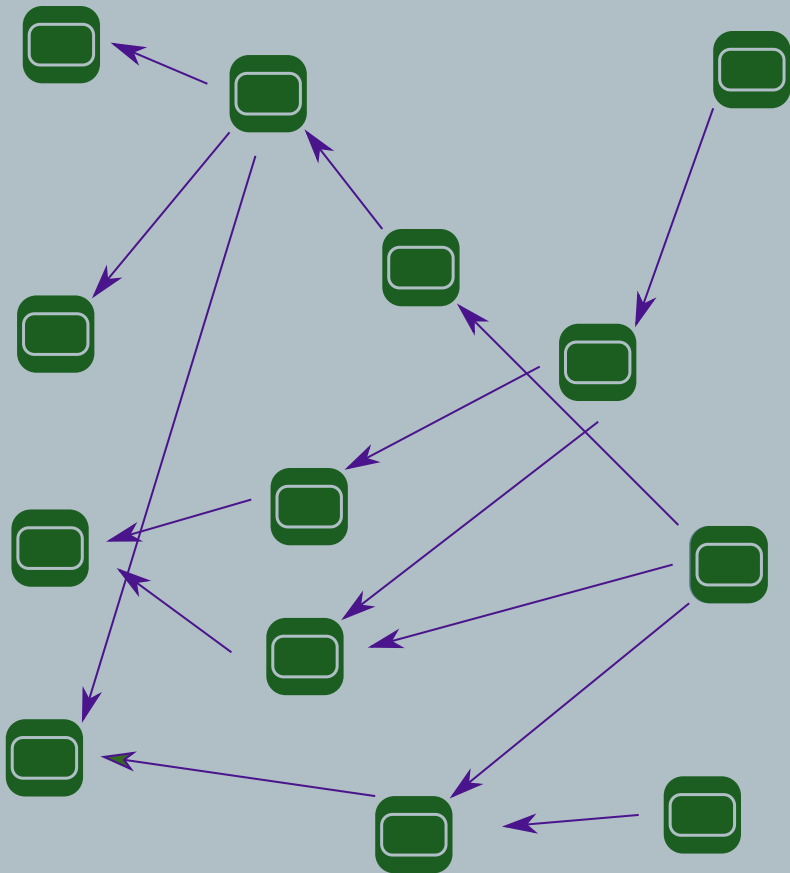
Scalable



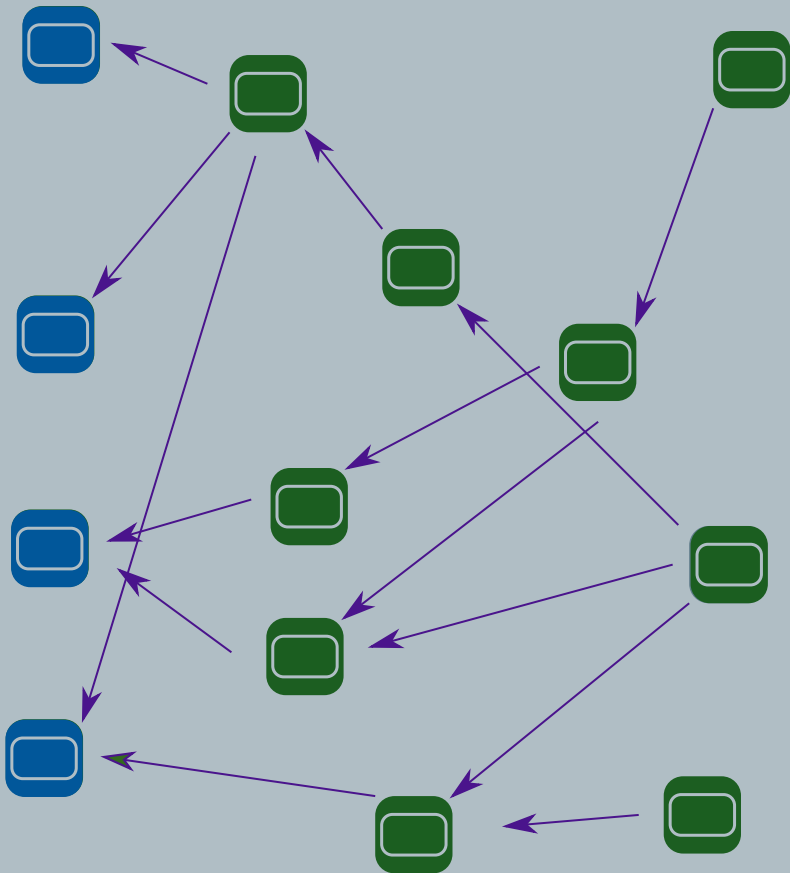




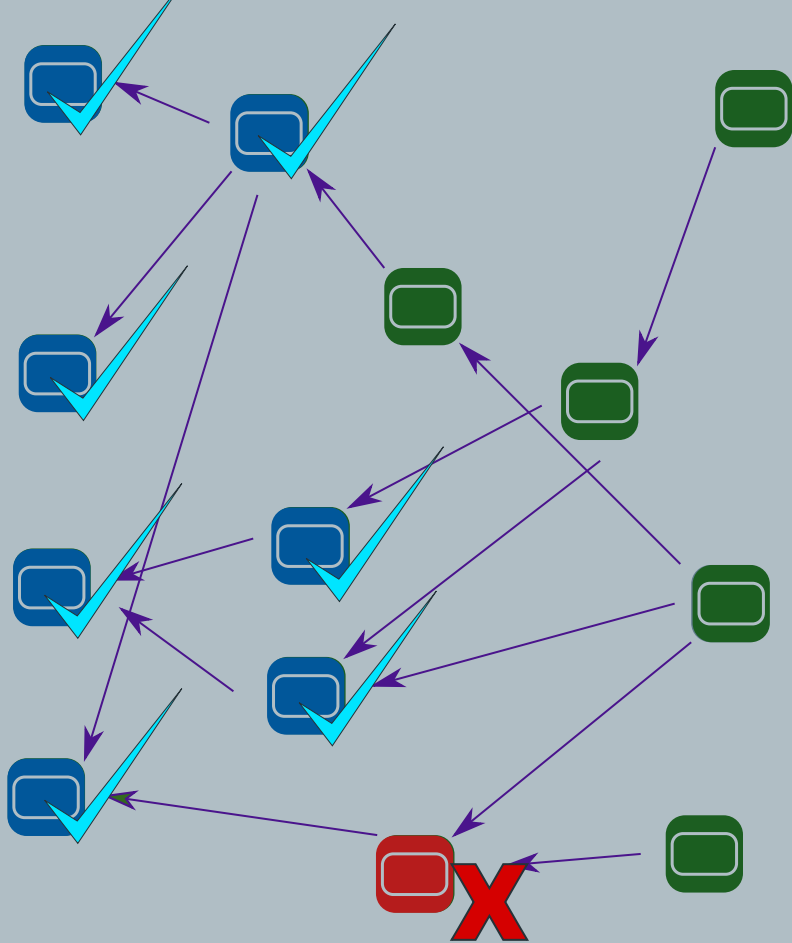
0060



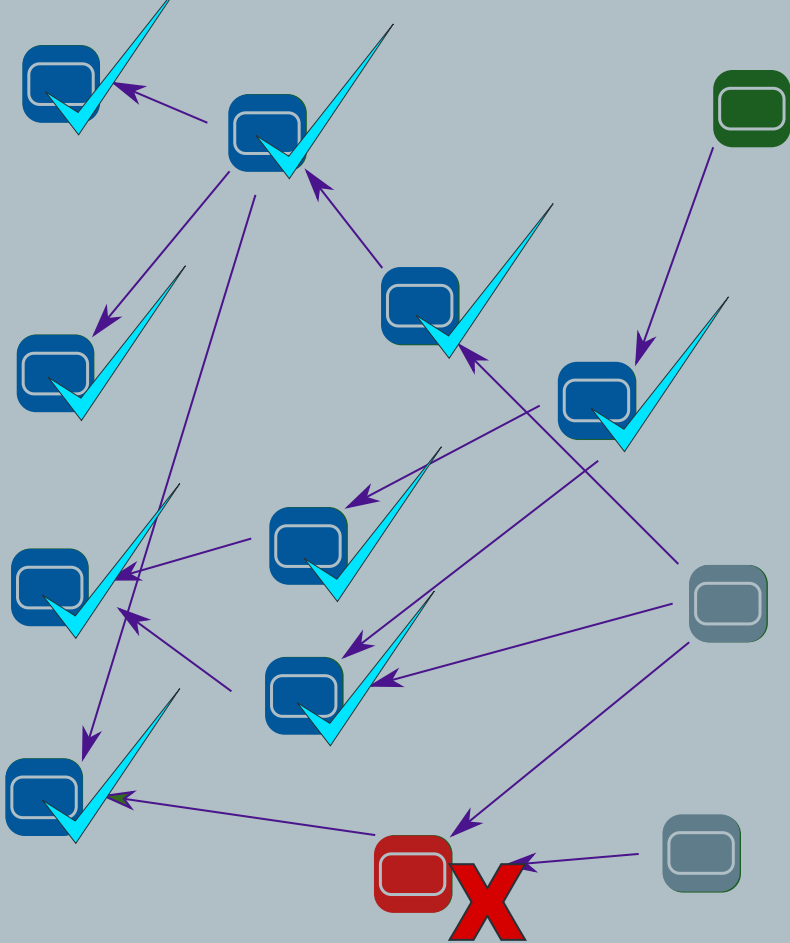
←
Depends
on



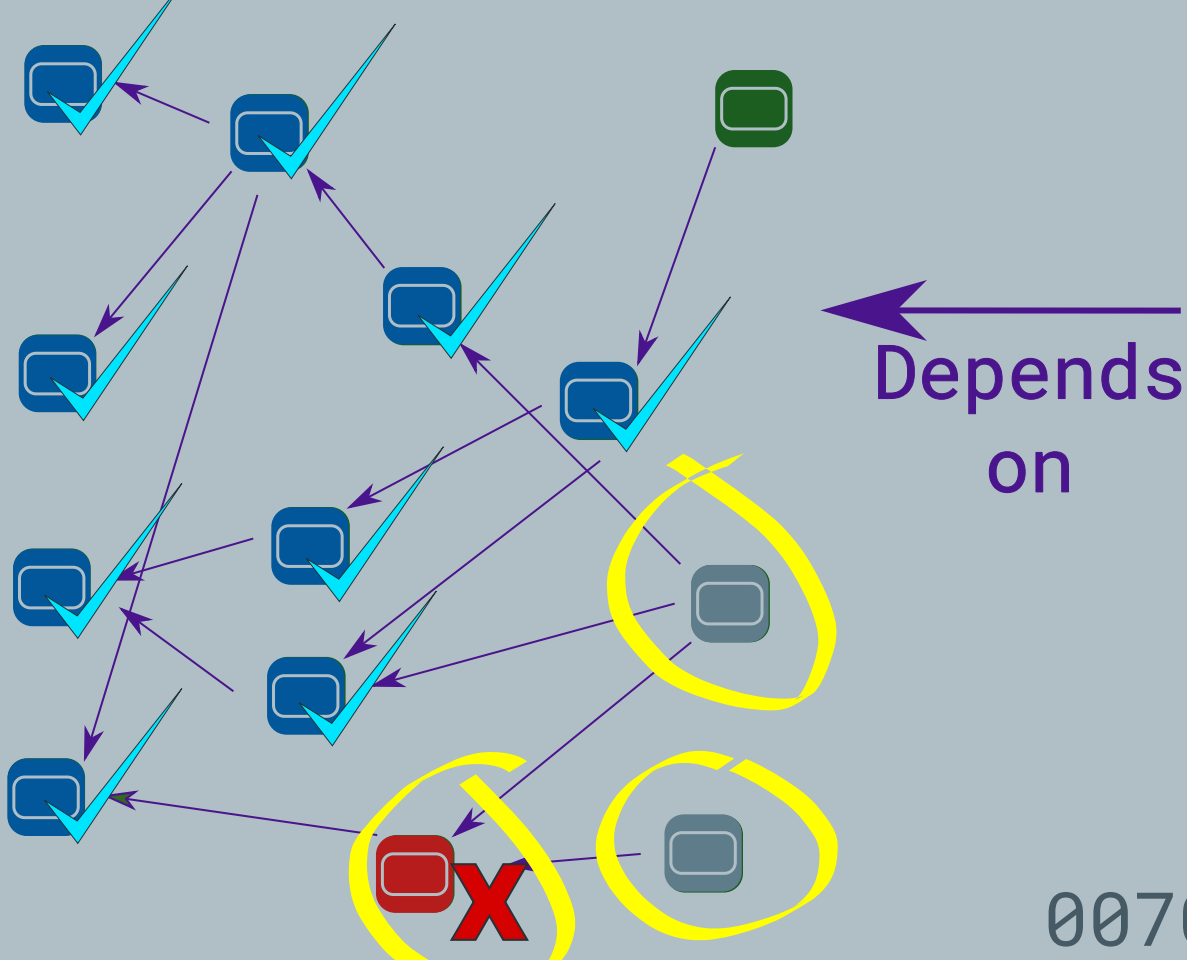
←
Depends
on



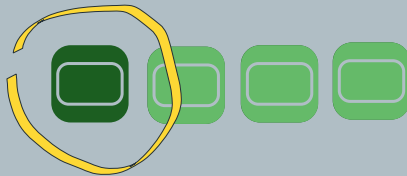
← Depends on

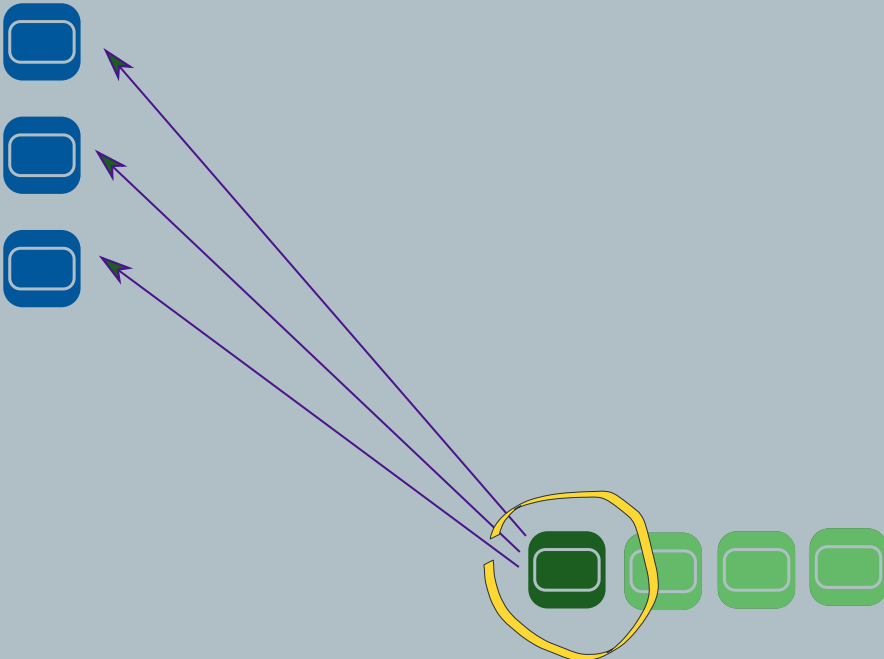


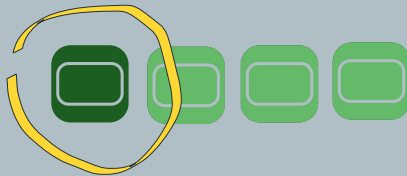
← Depends on

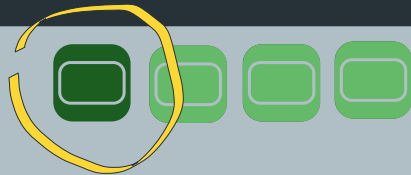




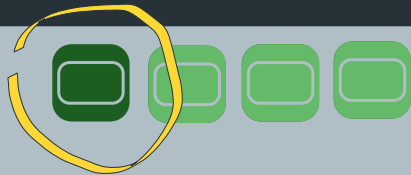




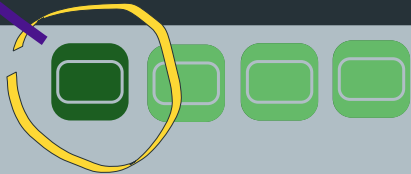
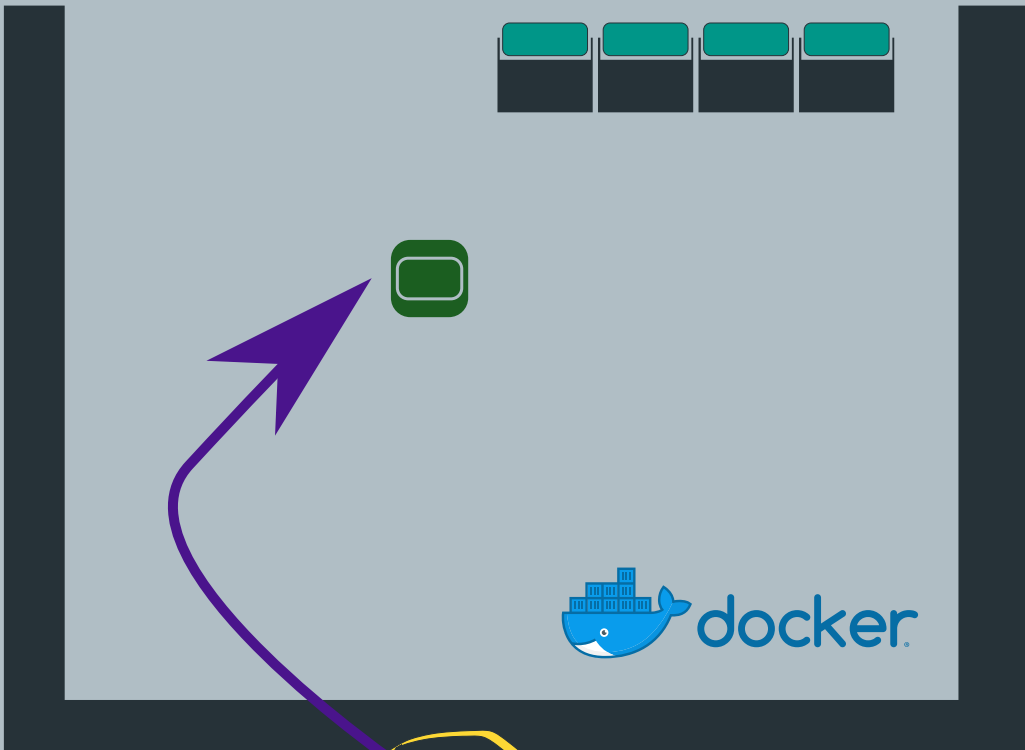


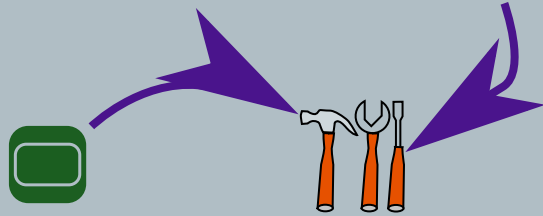


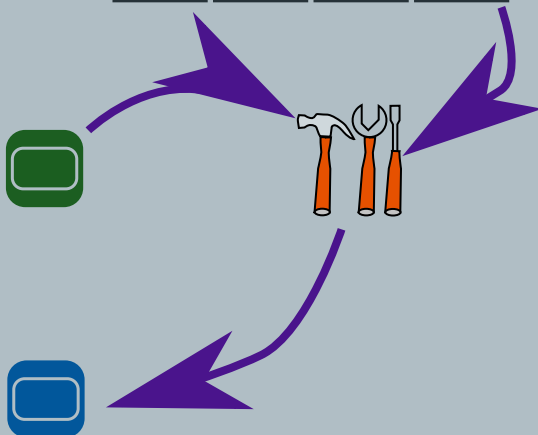
0080



0080

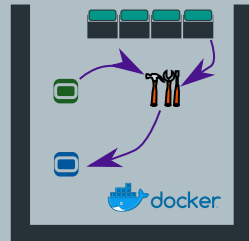
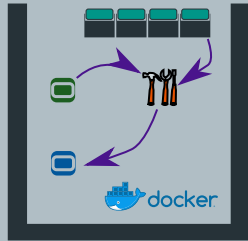
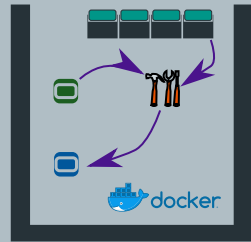
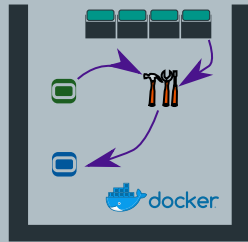
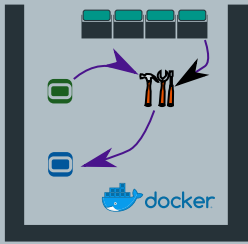




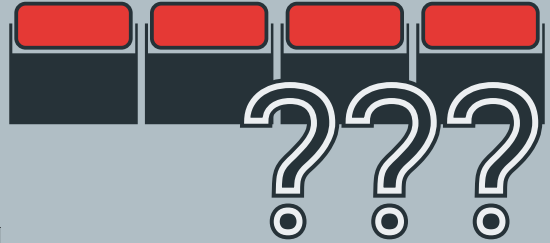


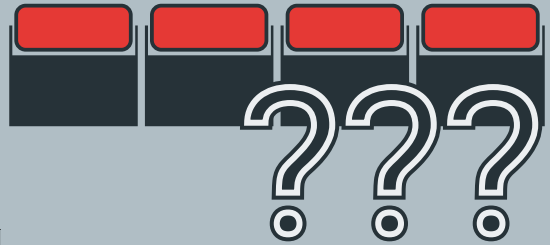


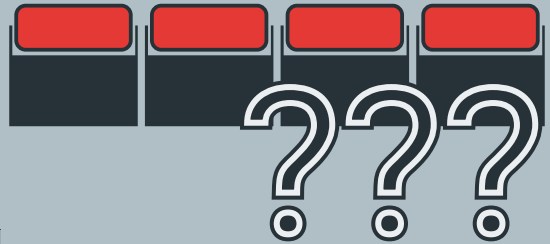


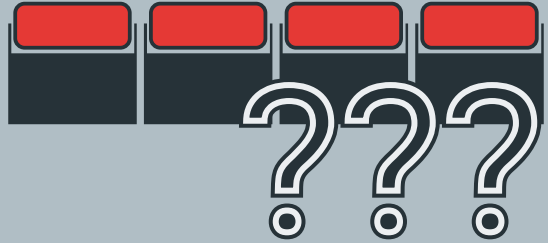






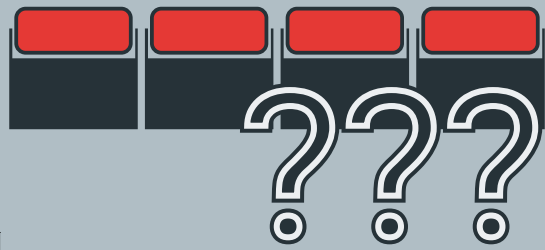






/usr/bin

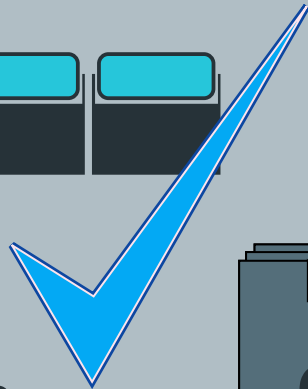
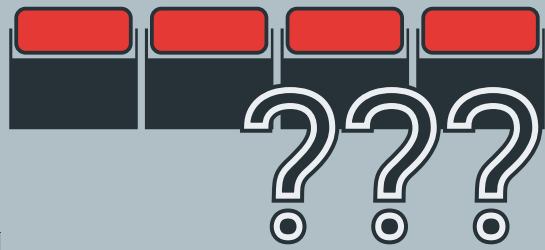




/usr/bin



0950



/usr/bin

/usr/lib



0950



/usr/bin

/usr/lib

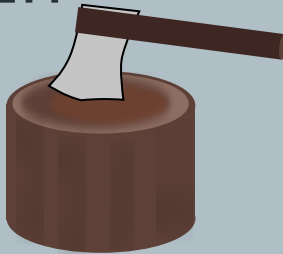


0950

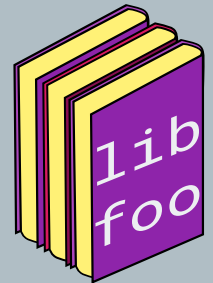


/usr/bin

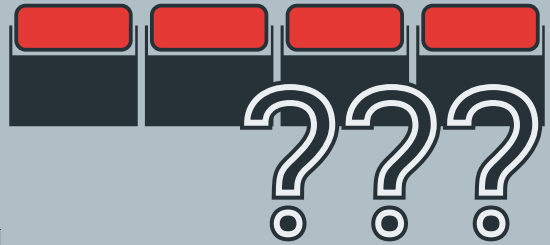
/usr/lib



foo
.exe

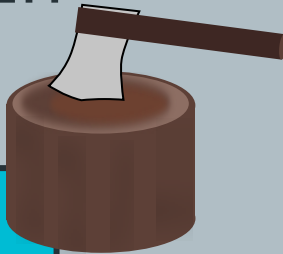


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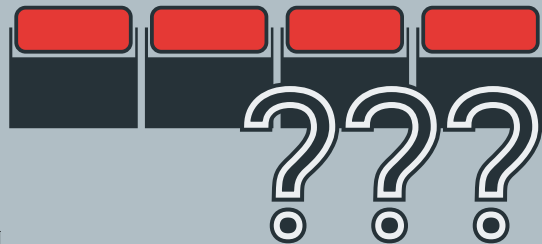


/usr/bin

/usr/lib



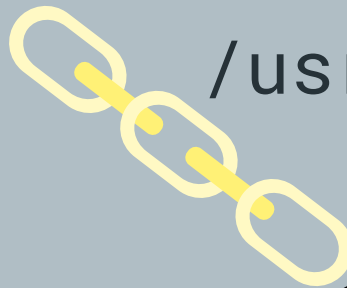
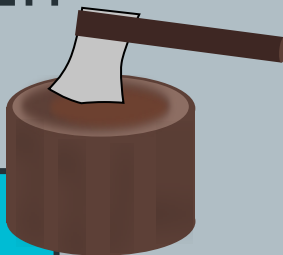
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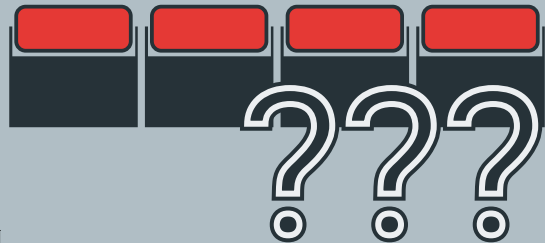
/usr/bin



/usr/lib



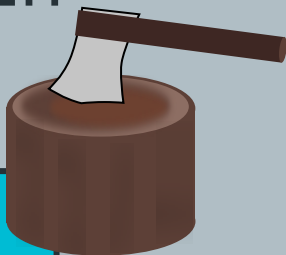
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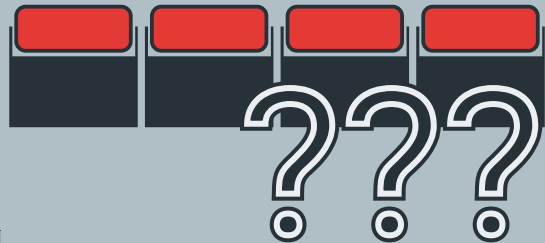


/usr/bin



/usr/lib

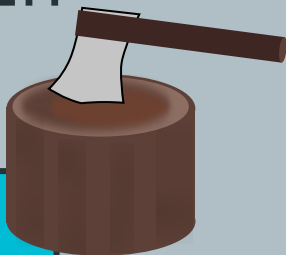




/usr/bin



/usr/lib

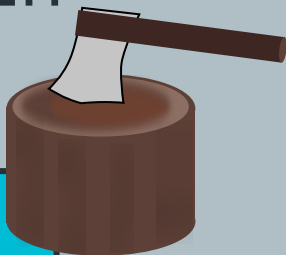




/usr/bin



/usr/lib

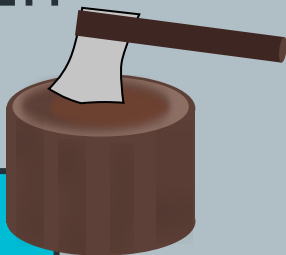




/usr/bin



/usr/lib



Hybrid Packages



0100



0110



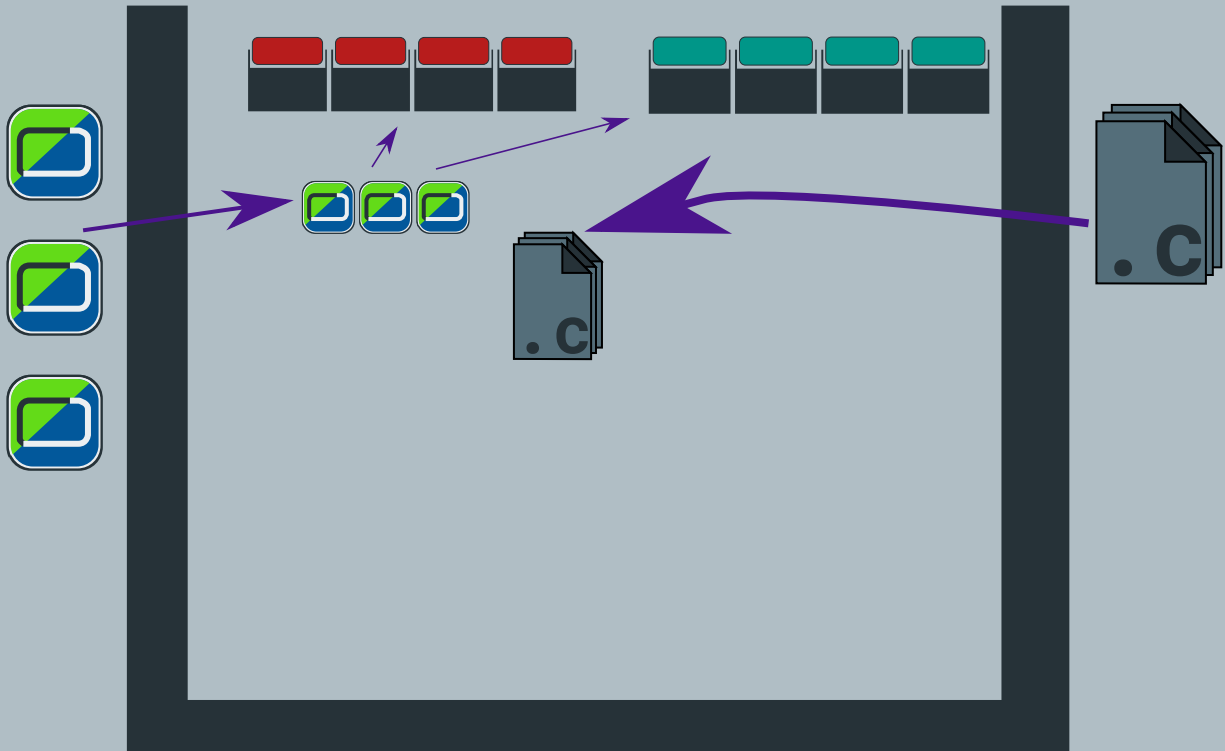
0110



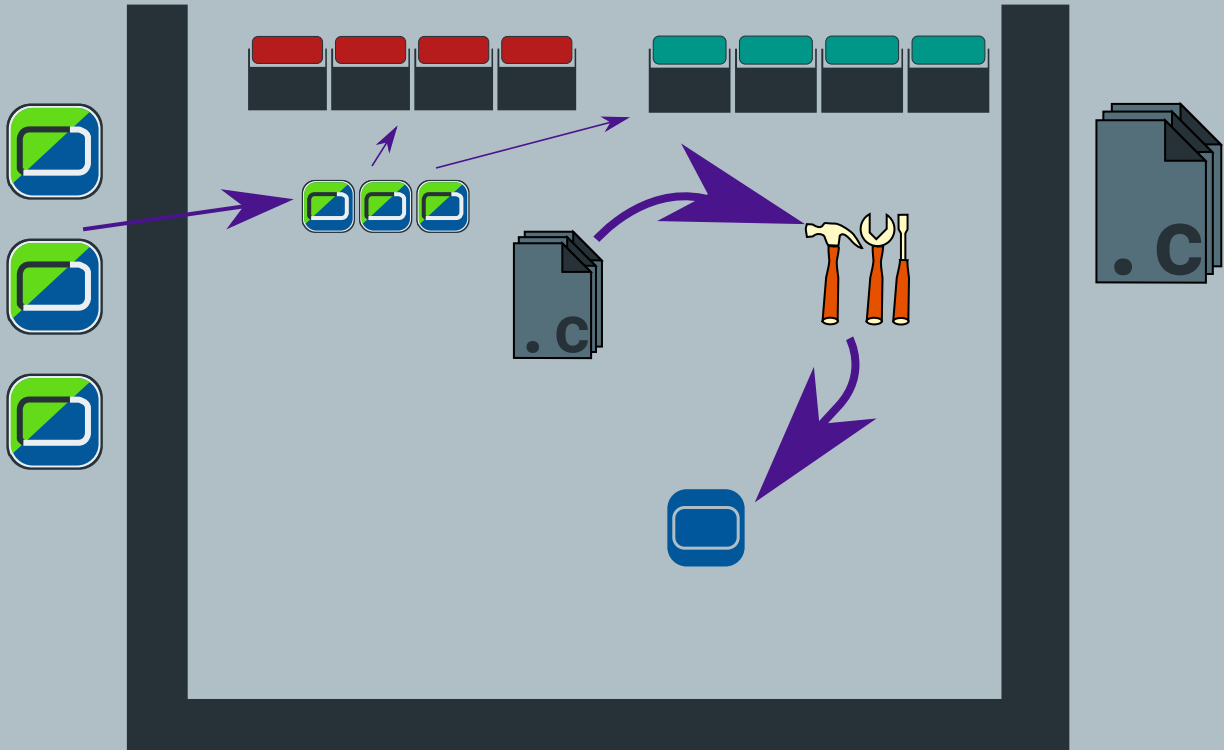
0110



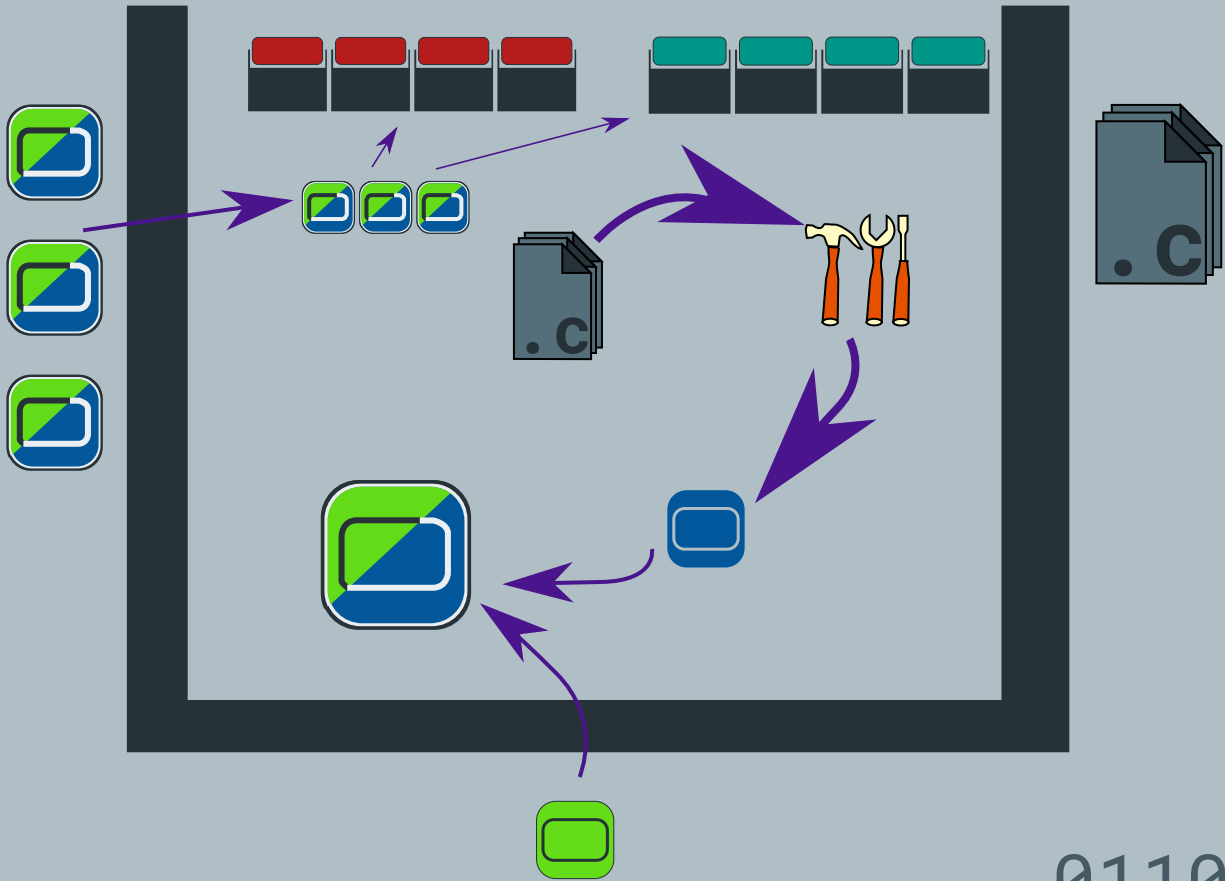
0110



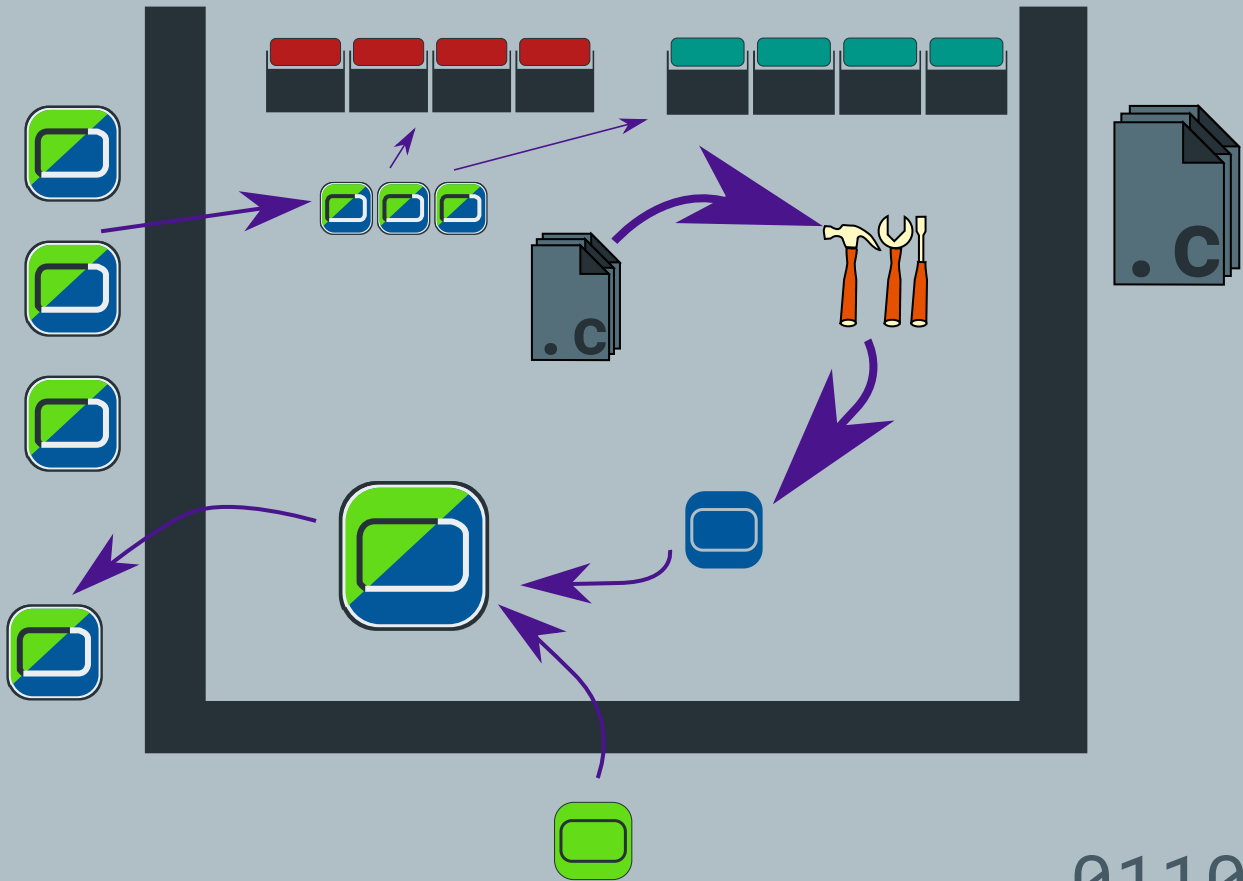
0110



0110



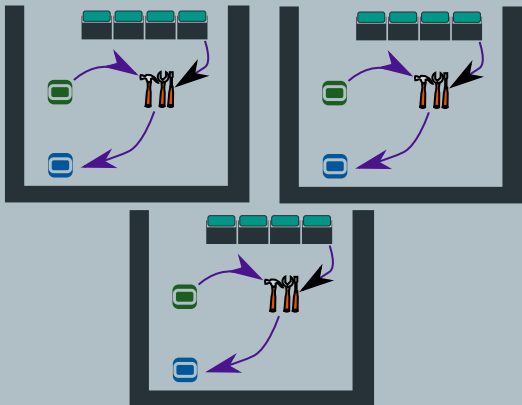
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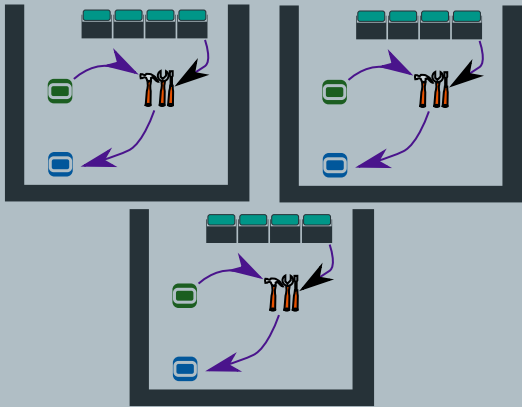
0110

Tuscan

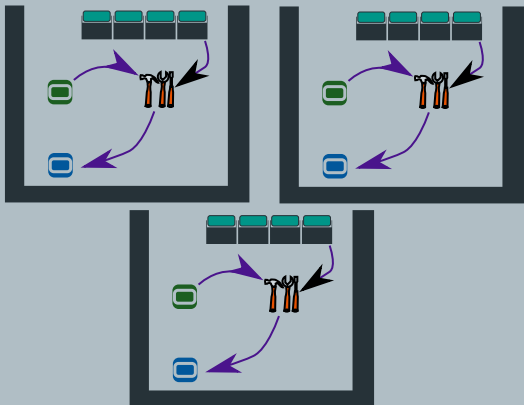
0120



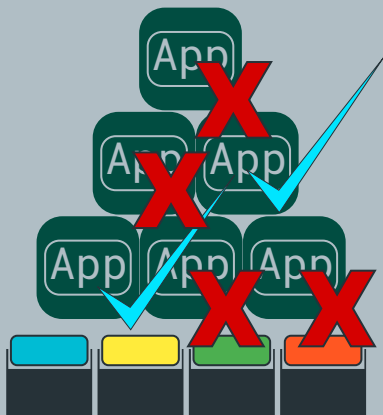
Tuscan



Tuscan



Tuscan

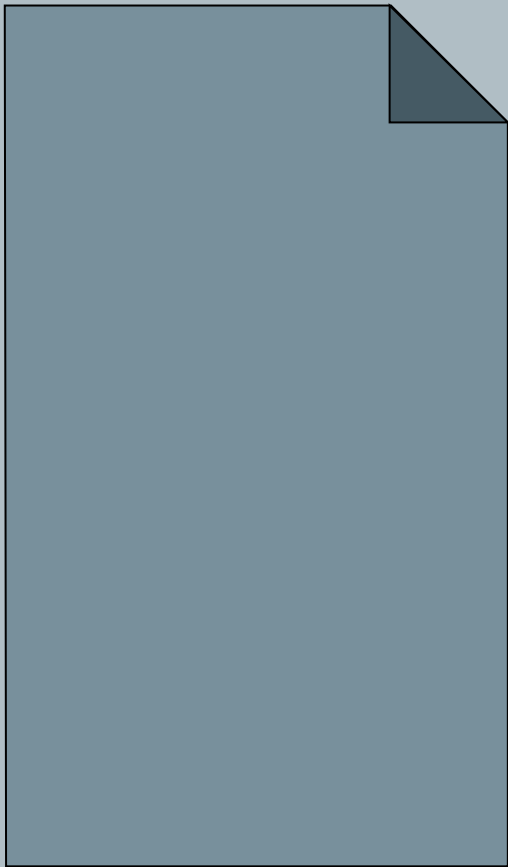


Catalogue

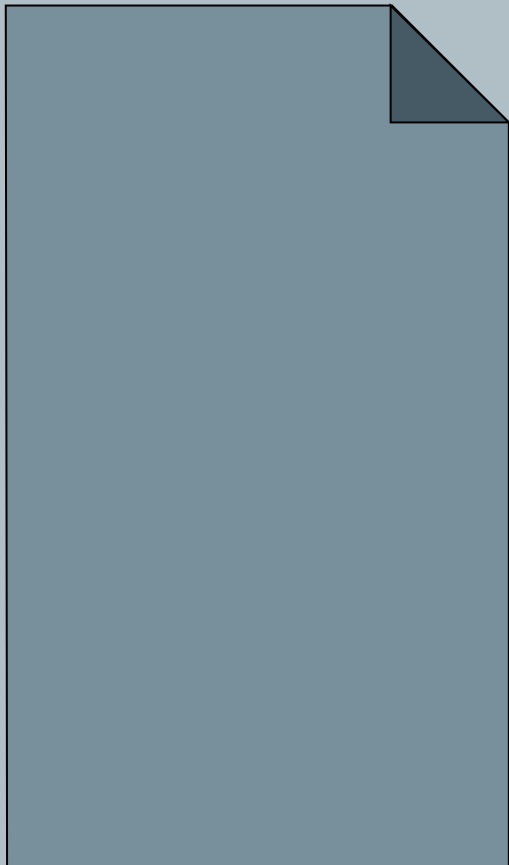
0130



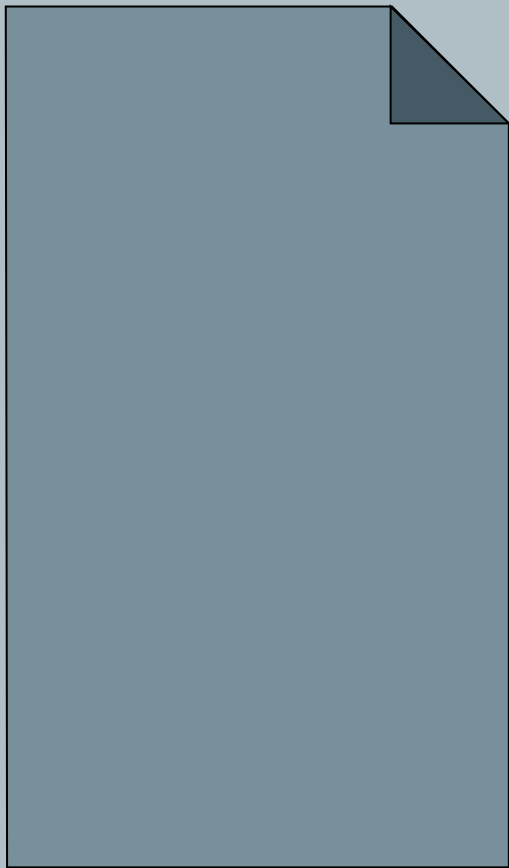
0130



0130



0130



0130

/native



/target



0130

/native



/target



Makefile

```
# $CC foo.c  
gcc foo.c
```

/native



/target



CC=clang

Makefile

```
# $CC foo.c  
gcc foo.c
```


/native



/target



gcc



CC=clang

Makefile

```
# $CC foo.c  
gcc foo.c
```

/native



/target



CC=android-gcc

Makefile

PATH=

/usr/bin

...

$\$$ CC foo.c

0130

/native



/target



???



CC=android-gcc

Makefile

```
PATH=
```

```
  /usr/bin
```

```
...
```

```
$CC foo.c
```

/native



/target



foo.c

```
#include  
  <gnu/  
  stubs-32.h  
>
```

/native



/target



X

#include

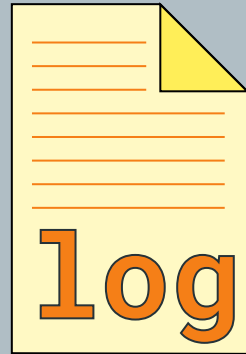
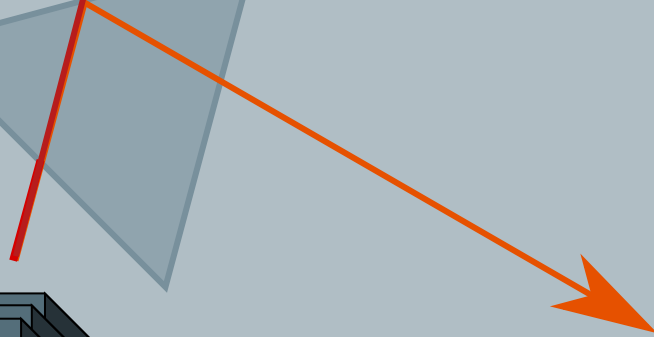
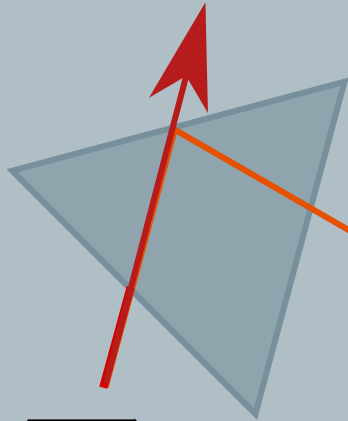


foo.c

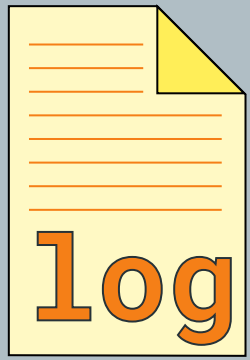
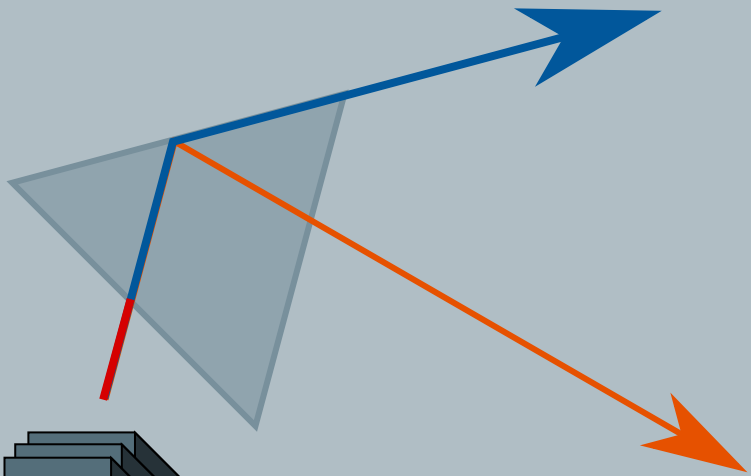
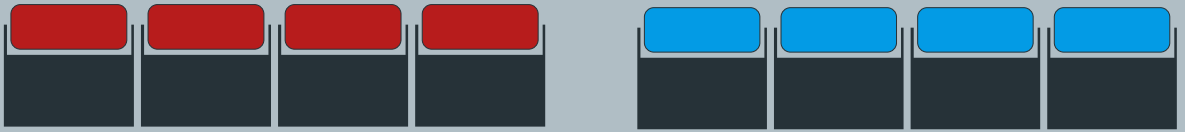
```
#include  
  <gnu/  
  stubs-32.h  
>
```



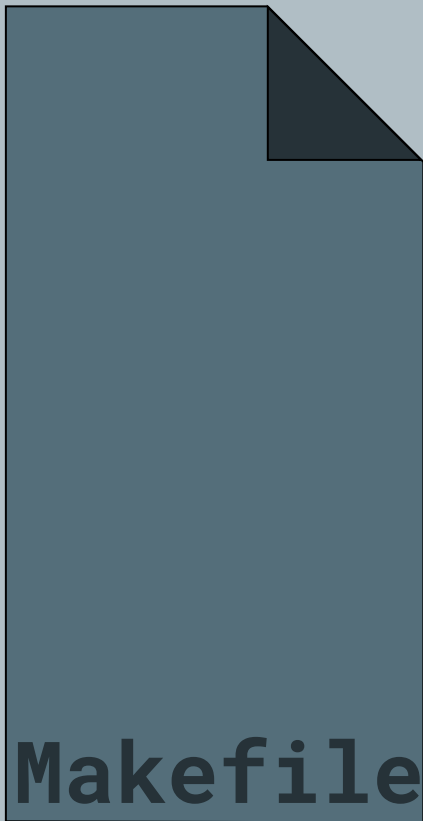
0150



0150



0150



0170

```
posix_spawn( gcc )
```

Makefile

0170

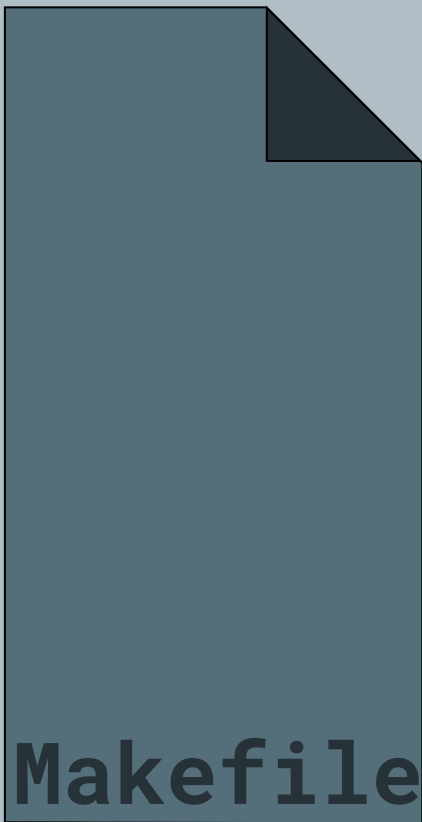
```
posix_spawn( gcc )
```

```
execve(android-gcc,  
PATH)
```

Makefile

0170

RED



0175

RED



Makefile

0175

RED

```
posix_spawn( gcc )
```

Makefile

0175

RED

```
posix_spawn(clang)
```

Makefile

0175

RED

```
posix_spawn(clang)
```

```
execve(android-gcc,  
PATH)
```

Makefile

0175

RED

```
posix_spawn(clang)
```

```
execve(android-gcc,  
PATH)
```

Makefile

0175



gcc

glibc

x86_64

0180

gcc

clang

glibc

glibc

x86_64

x86_64

gcc

clang

clang

glibc

glibc

musl

x86_64

x86_64

x86_64

gcc

clang

clang

android-gcc

glibc

glibc

musl

bionic

x86_64

x86_64

x86_64

arm-32

Successful builds



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