

Coroutines

@danluu

Kinda like functions,
but cooler

Applications

- Networking (gevent)
- OS (cooperative multi-tasking)
- Generators
- Foundation for higher-level concurrency models

stack growth



main()

}

frame #1

foo()

}

frame #2

bar()

}

frame #3

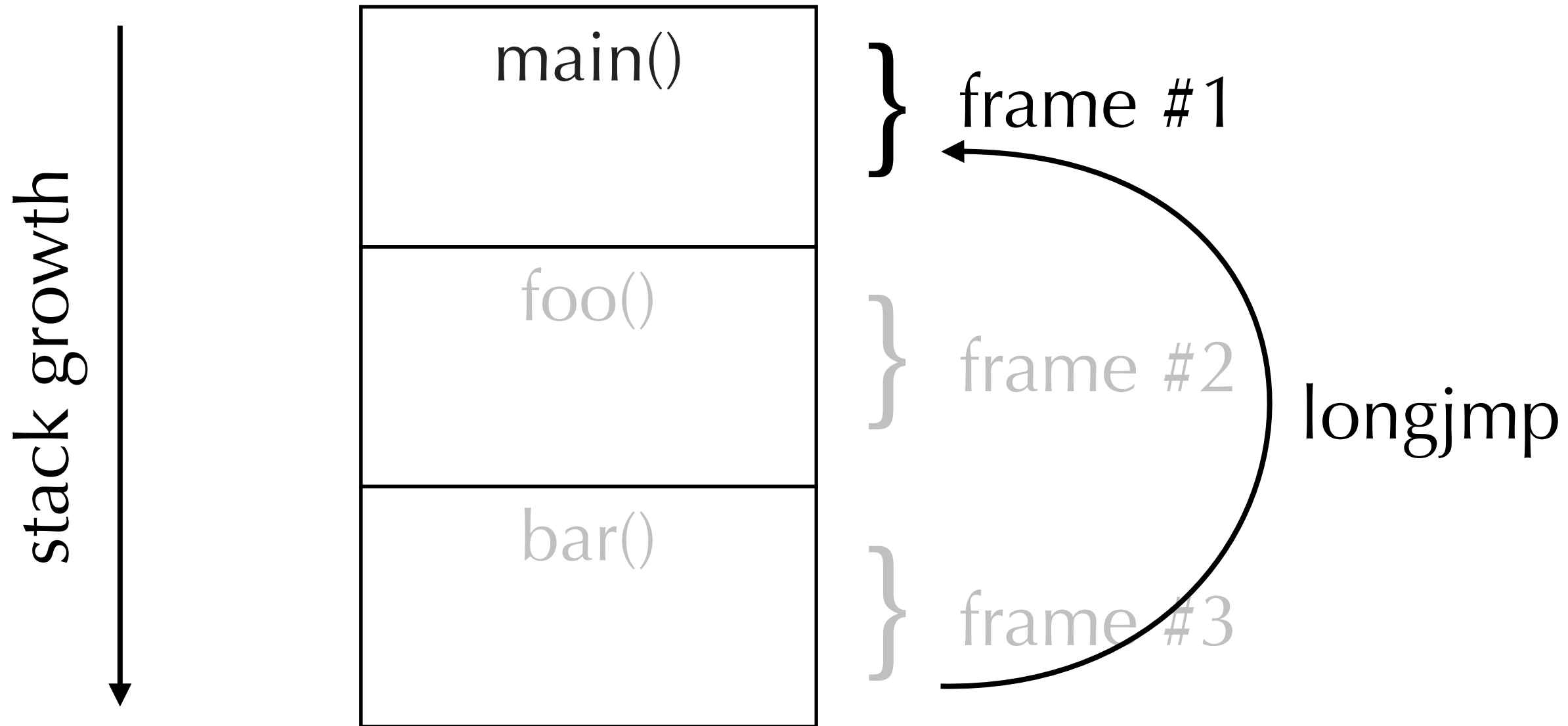
setjmp & longjmp

```
jmp_buf buf;

void bar() {
    longjmp(b);
}

void foo() {
    bar();
}

int main() {
    setjmp(b);
    foo();
}
```



```
jmp_buf buf;
```

```
void bar() {  
    longjmp(b);  
}
```

```
void foo() {  
    bar();  
}
```

```
int main() {  
    setjmp(b);  
    foo();  
}
```


stack growth



main()

} frame #1

xxx()

} frame #2

coro1()

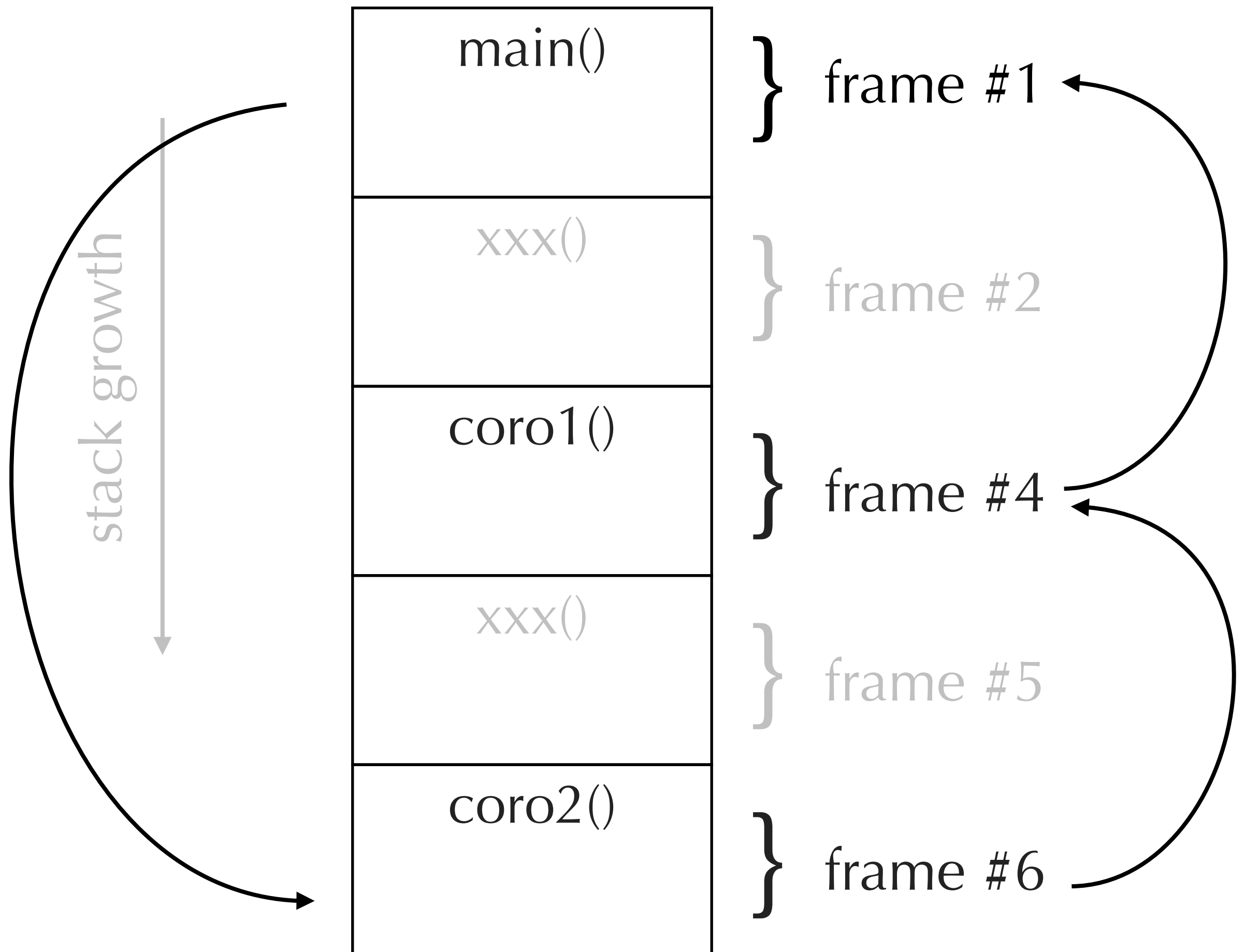
} frame #4

xxx()

} frame #5

coro2()

} frame #6



stack growth



main()

}

frame #1

coro1()

}

frame #2

foo()

}

frame #4

bar()

}

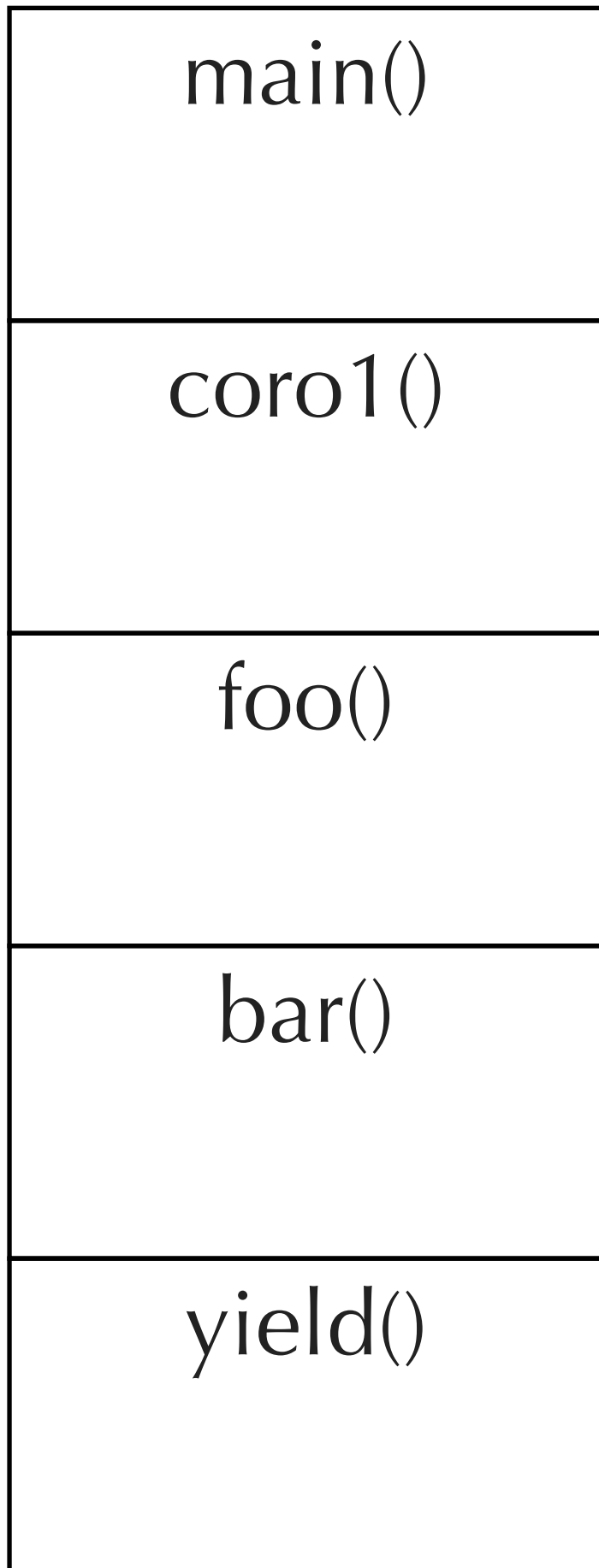
frame #5

yield()

}

frame #6

stack growth



}

frame #1

}

frame #2

}

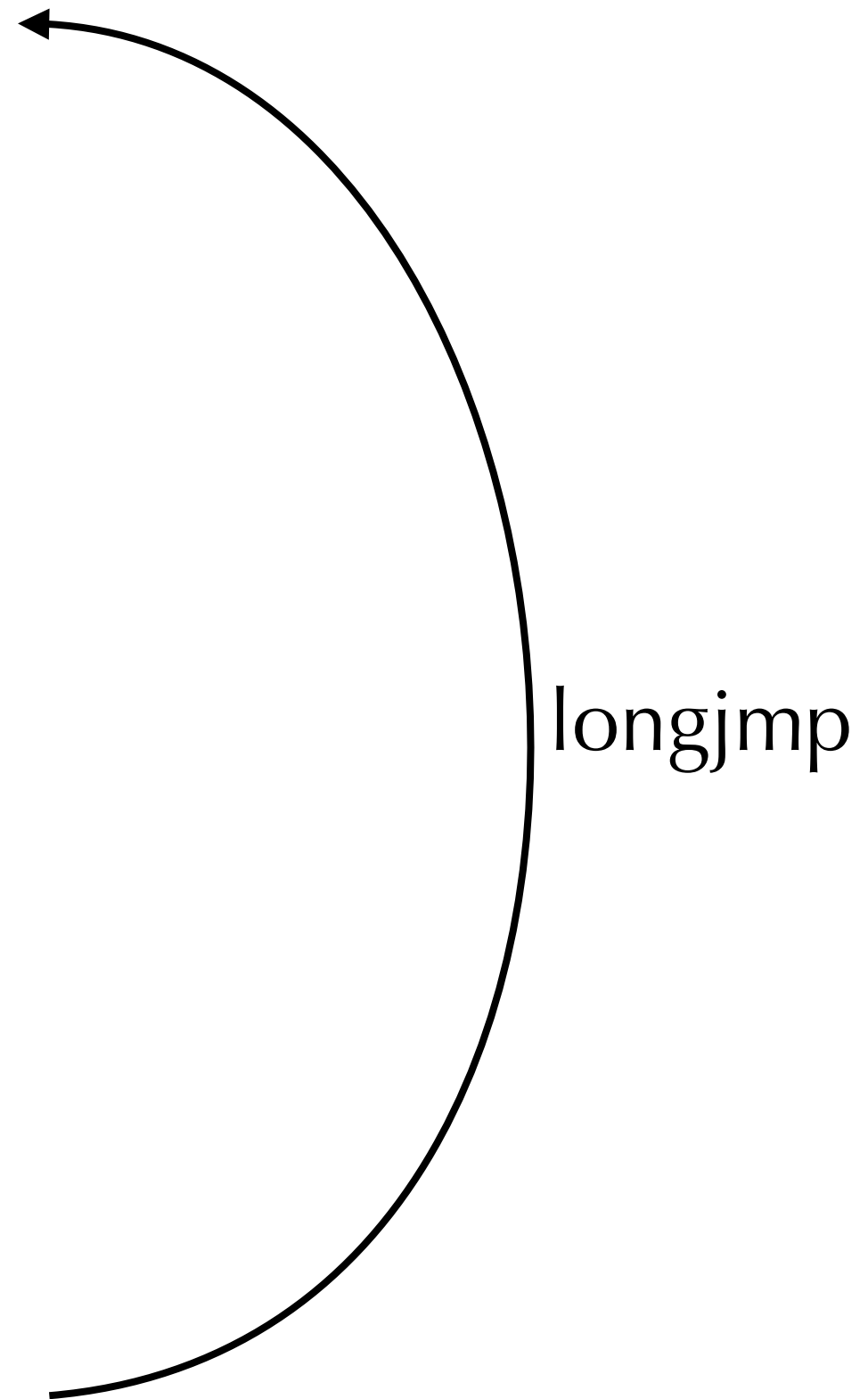
frame #4

}

frame #5

}

frame #6



stack growth



}

frame #1

}

frame #2

}

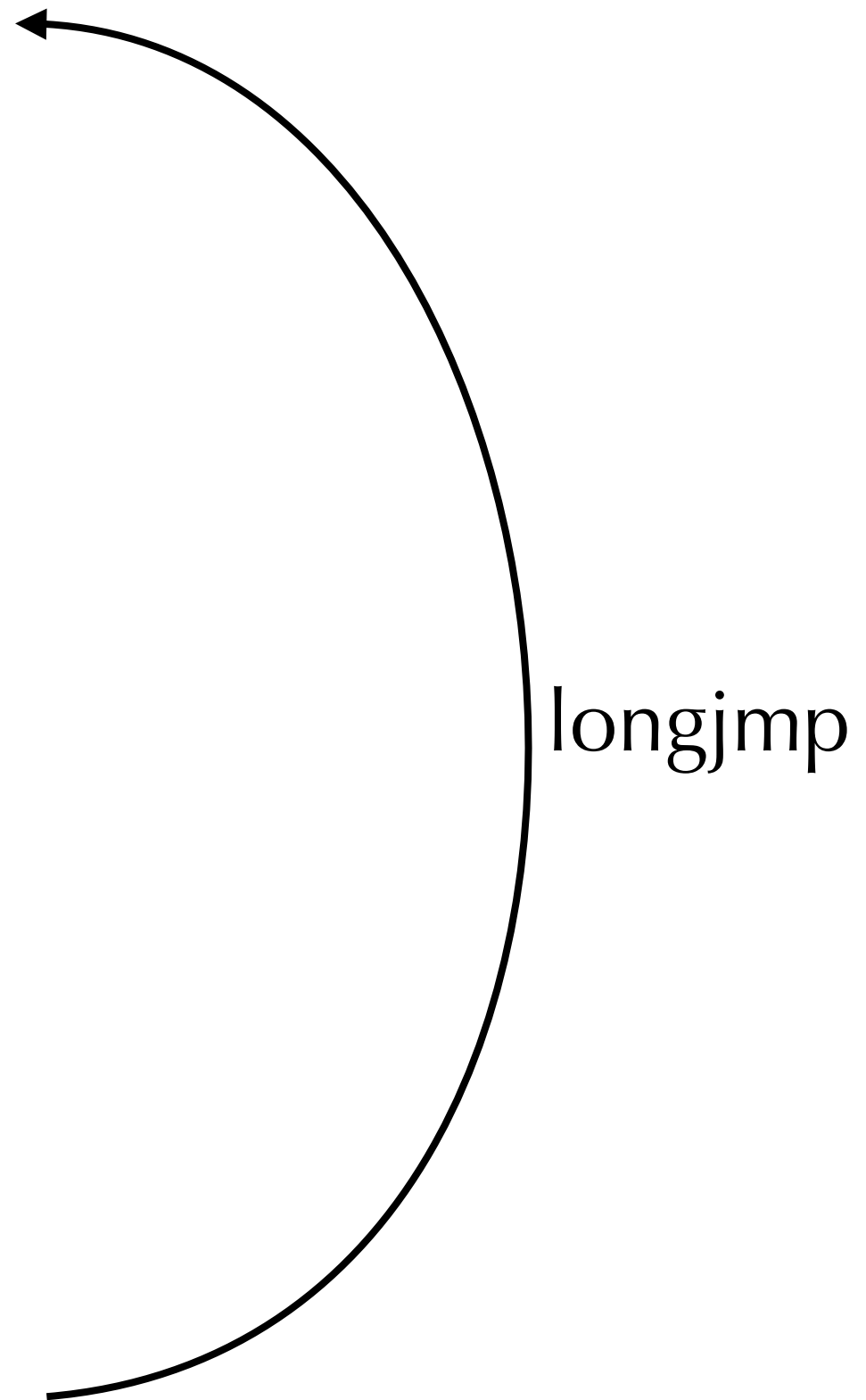
frame #4

}

frame #5

}

frame #6



longjmp

main()

} frame #1

stack growth



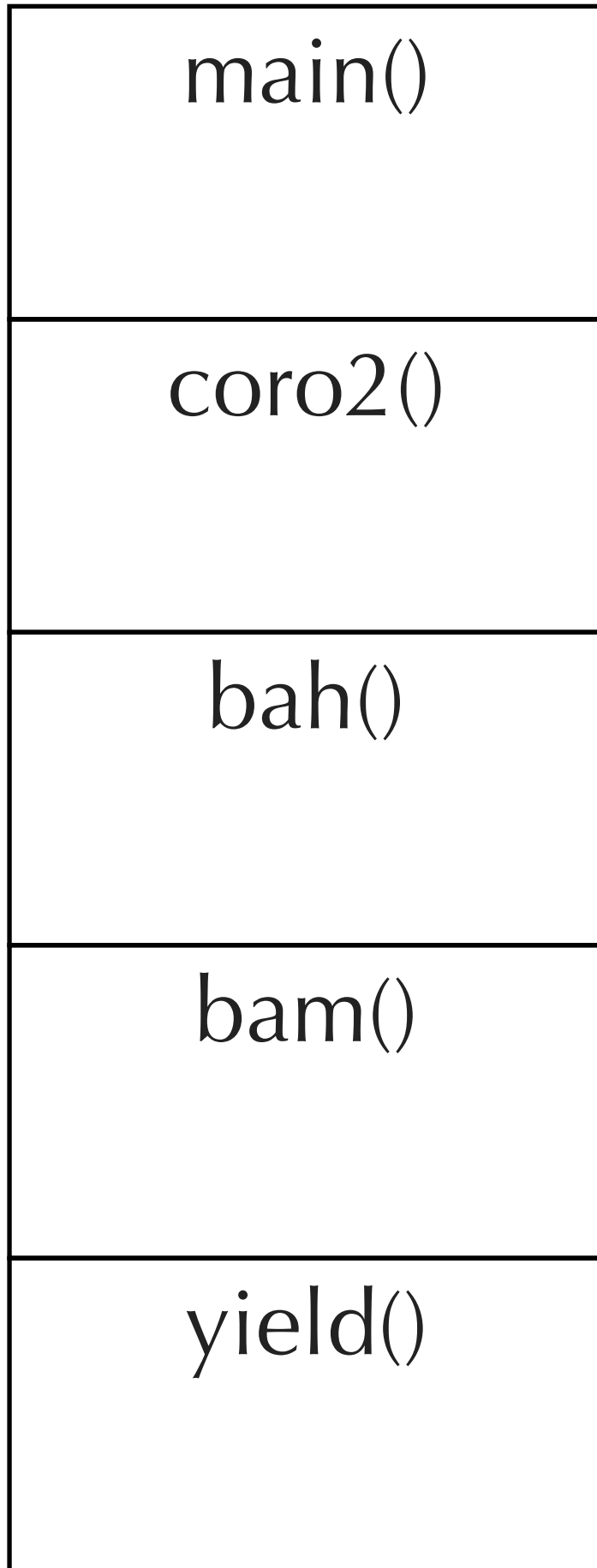
coro1()

foo()

bar()

yield()

stack growth



}

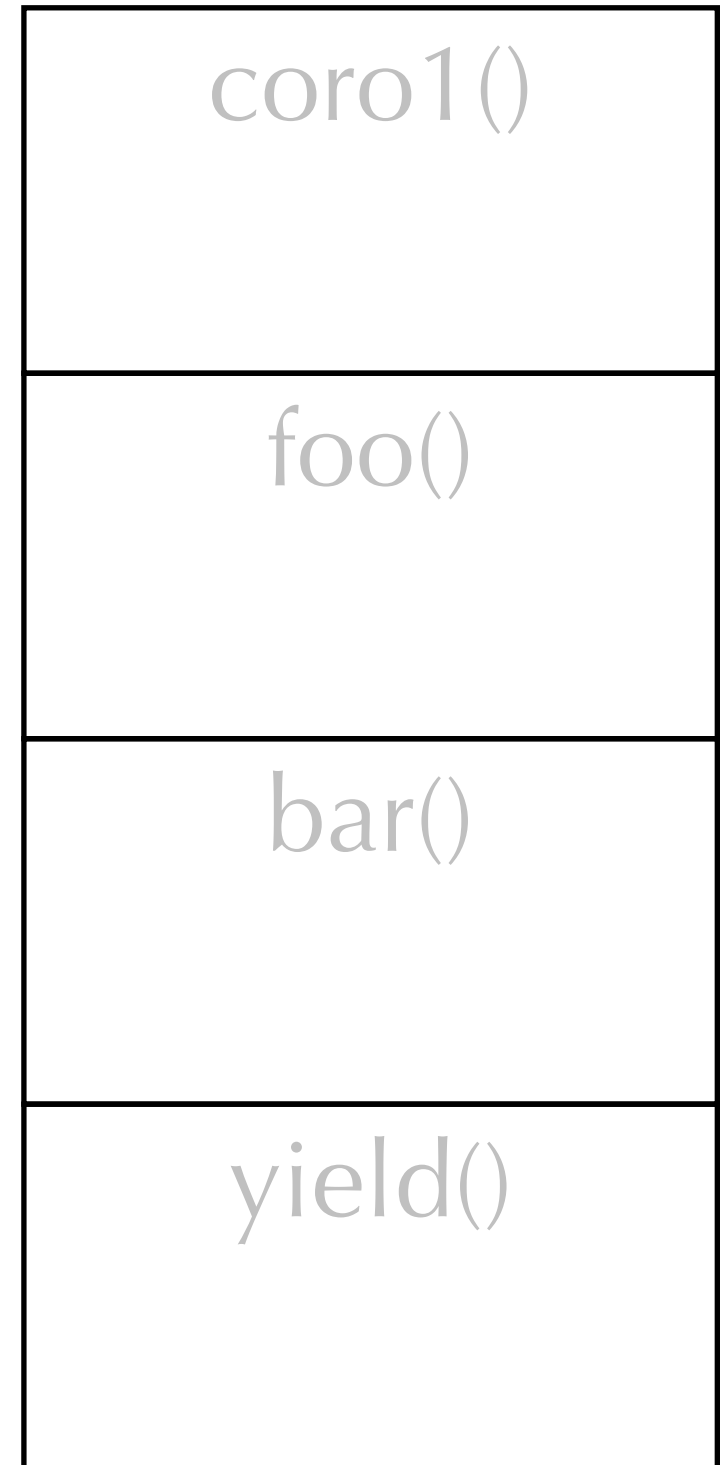
frame #1

}

}

}

}



main()

} frame #1

stack growth



coro2()

bah()

bam()

yield()

coro1()

foo()

bar()

yield()

main()

} frame #1

coro1()

foo()

bar()

yield()

stack growth



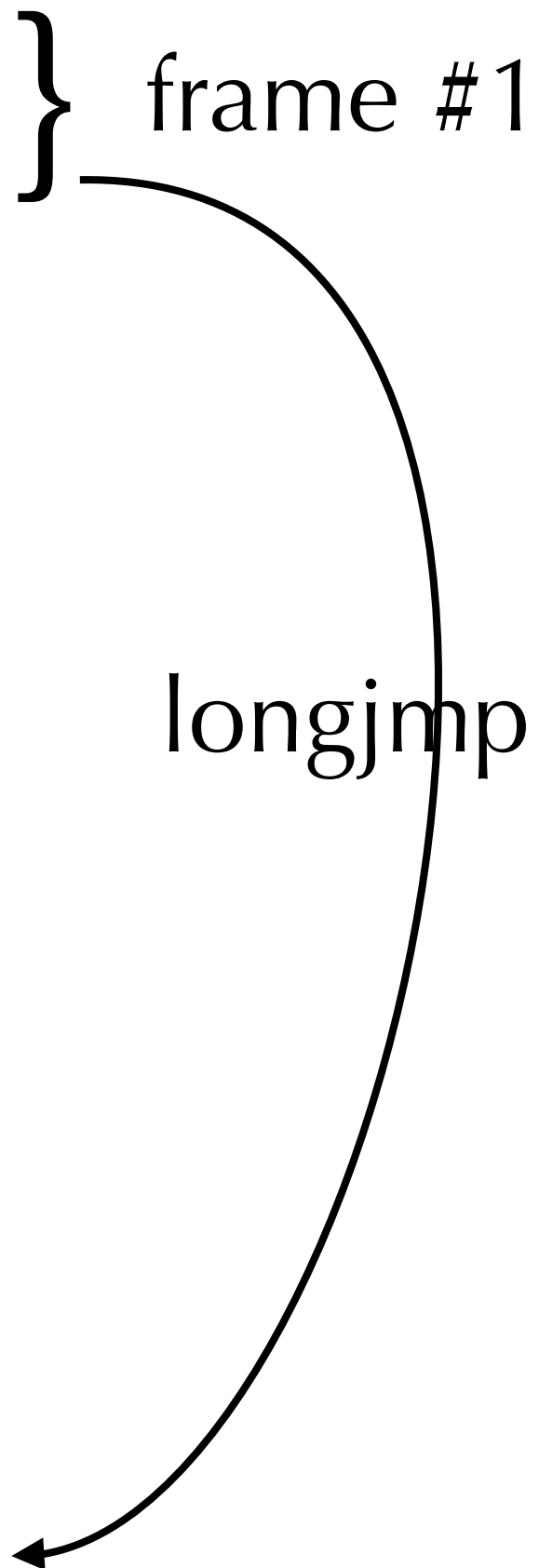
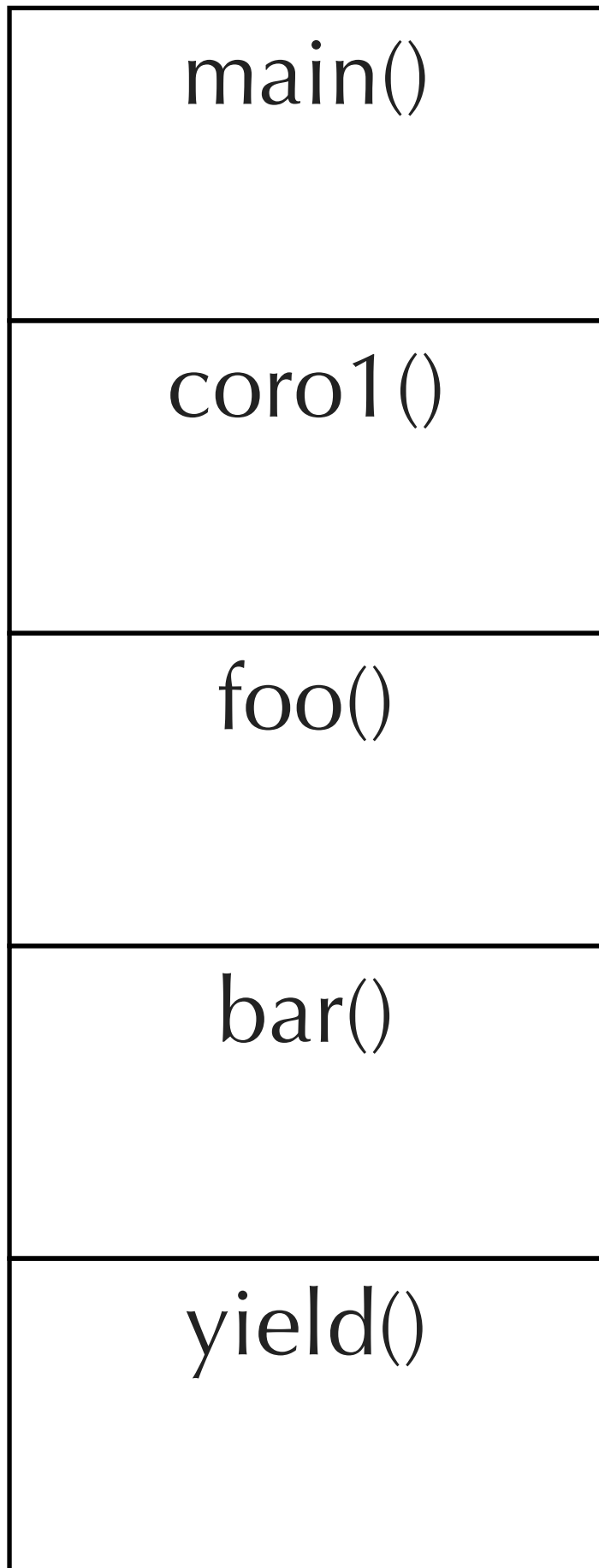
coro2()

bah()

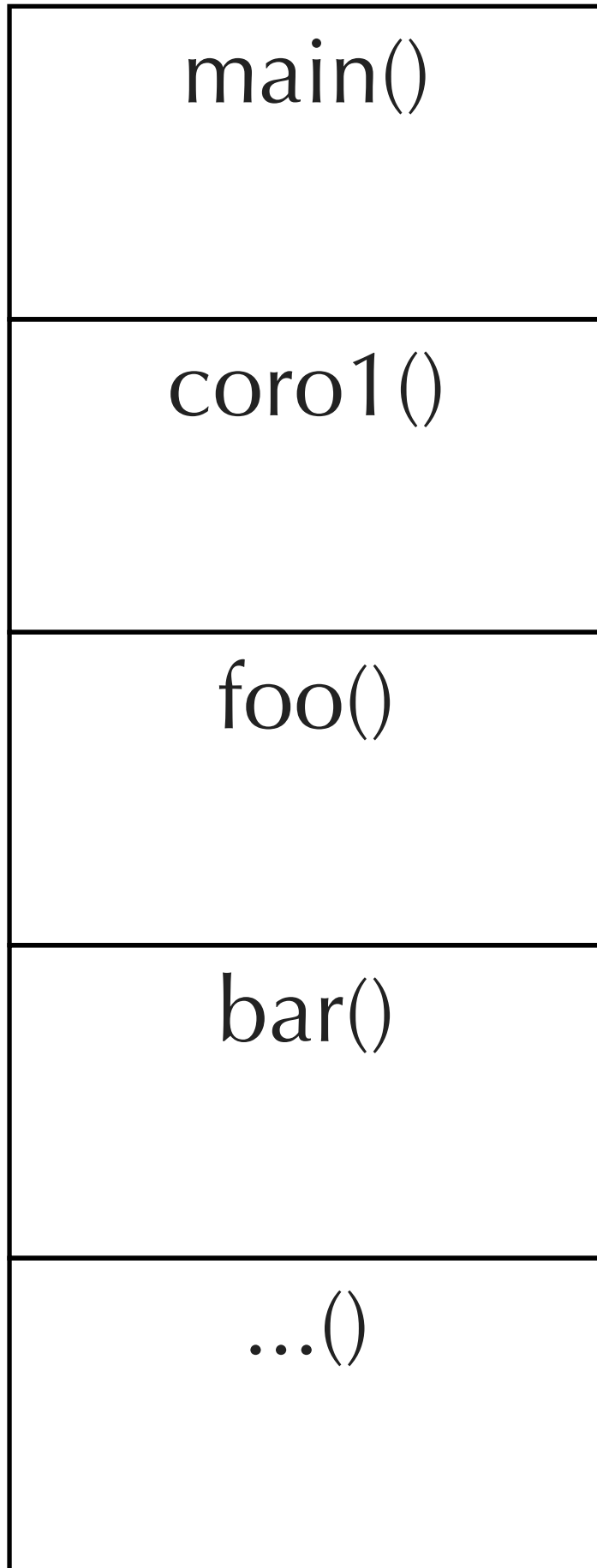
bam()

printf()

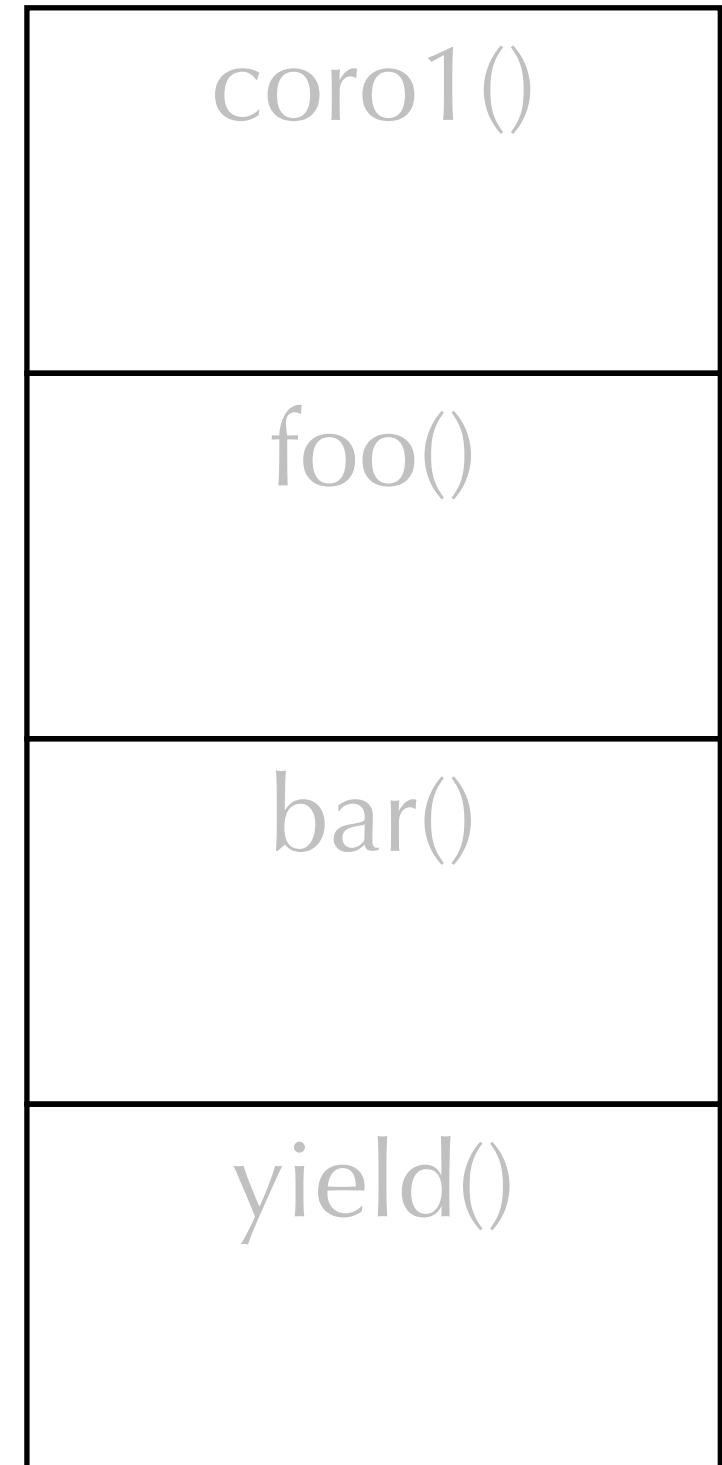
stack growth



stack growth



} frame #1



Channels

Go-style channels

- `channel.send(value)`: blocking
- `channel.recv()`: blocking
- unblocks when someone on the other end

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

[https://github.com/danluu/setjmp-
longjmp-ucontext-snippets/](https://github.com/danluu/setjmp-longjmp-ucontext-snippets/)