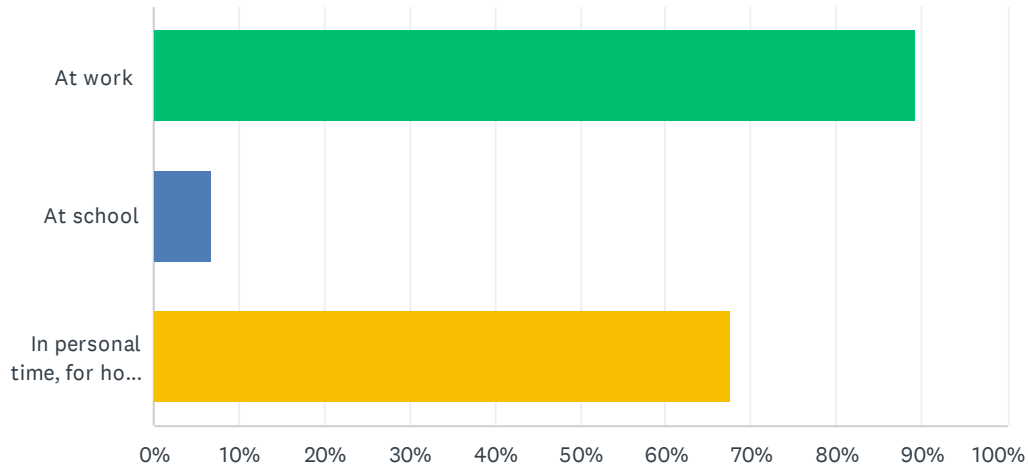


## Q1 Where do you use C++? (select all that apply)

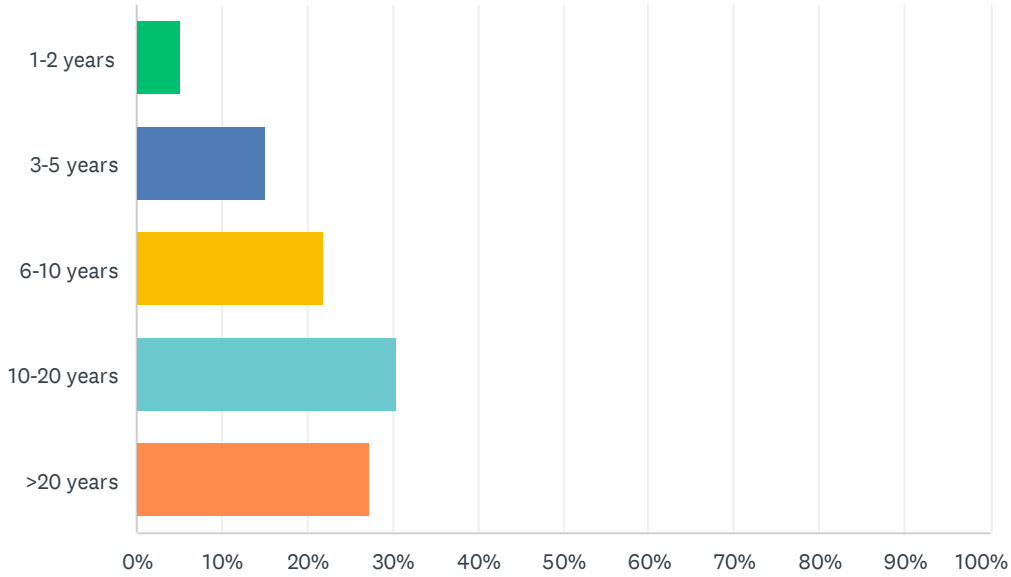
Answered: 1,720 Skipped: 6



ANSWER CHOICES	RESPONSES	
At work	89.24%	1,535
At school	6.80%	117
In personal time, for hobby projects or to try new things	67.62%	1,163
Total Respondents: 1,720		

## Q2 How many years of programming experience do you have in C++ specifically?

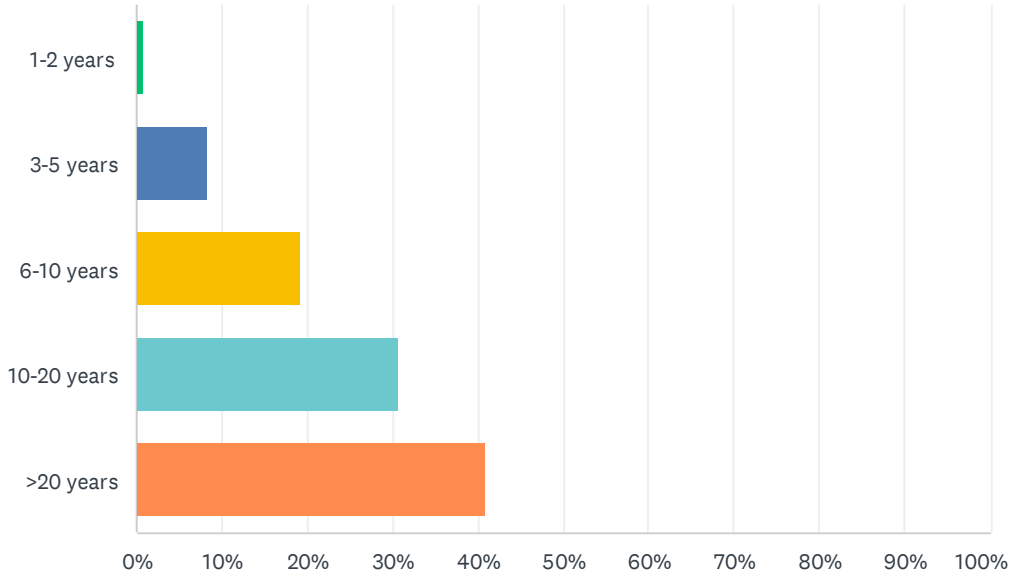
Answered: 1,722 Skipped: 4



ANSWER CHOICES	RESPONSES	
1-2 years	5.11%	88
3-5 years	15.16%	261
6-10 years	22.01%	379
10-20 years	30.43%	524
>20 years	27.29%	470
TOTAL		1,722

### Q3 How many years of programming experience do you have overall (all languages)?

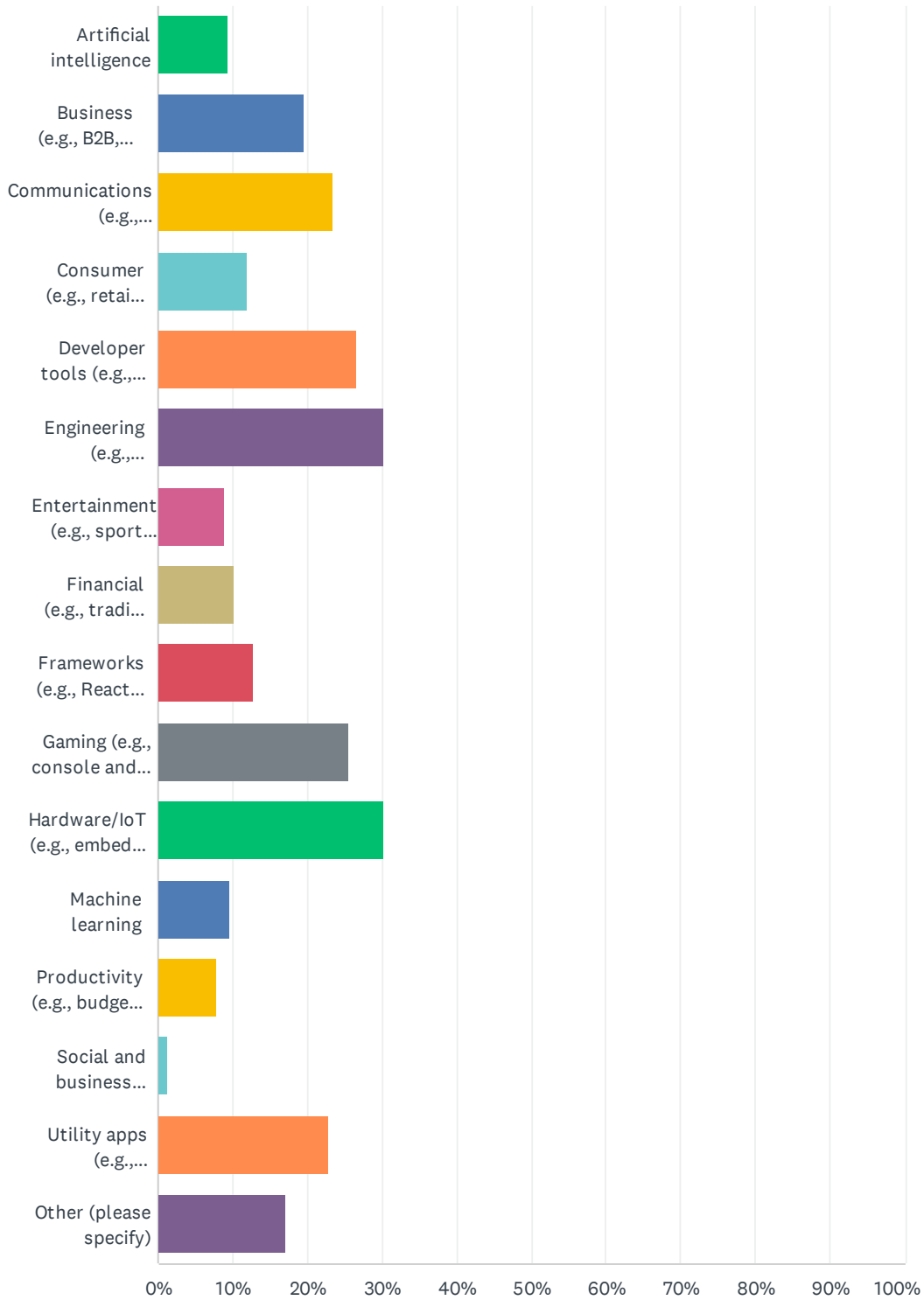
Answered: 1,716 Skipped: 10



ANSWER CHOICES	RESPONSES
1-2 years	0.87% 15
3-5 years	8.22% 141
6-10 years	19.23% 330
10-20 years	30.77% 528
>20 years	40.91% 702
TOTAL	1,716

## Q4 What types of projects do you work on? (select all that apply)

Answered: 1,715 Skipped: 11

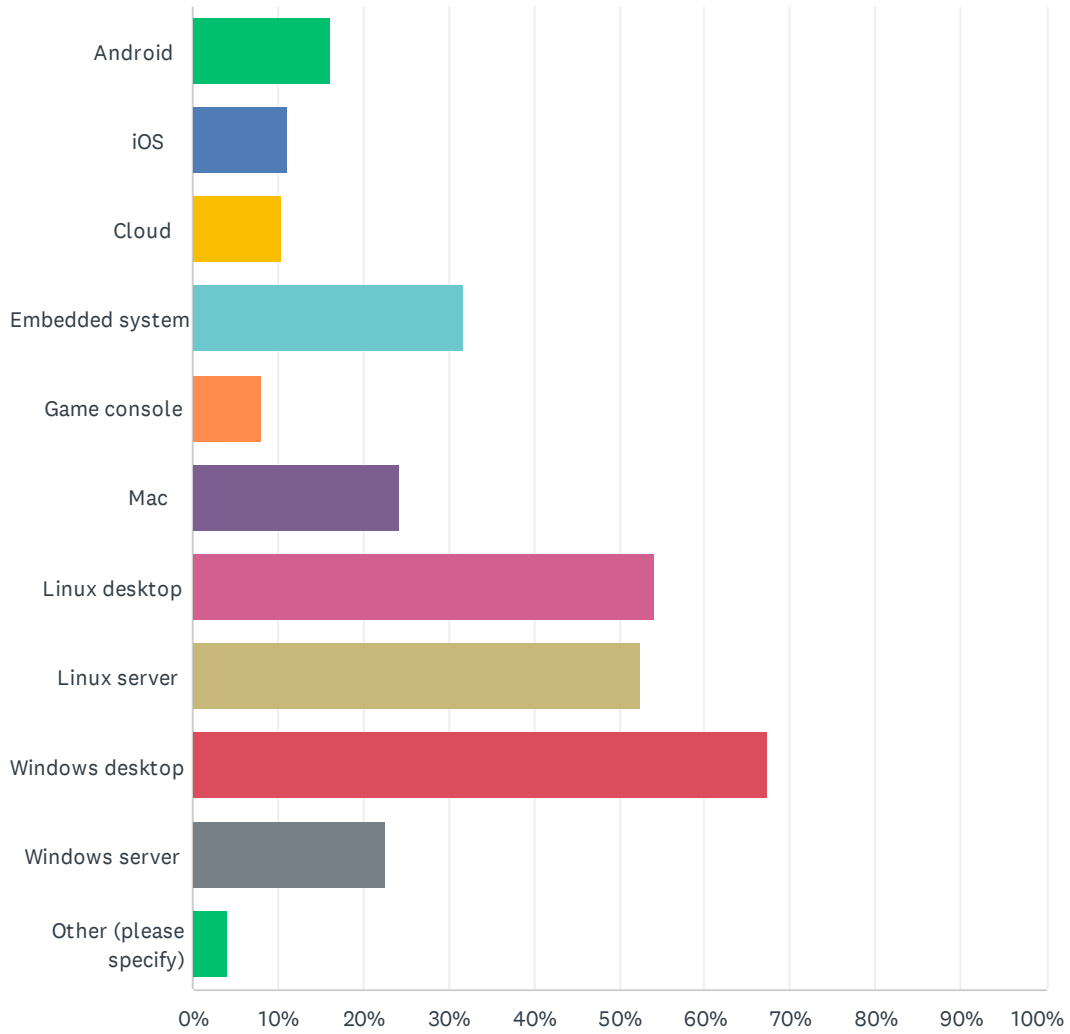


## 2023 Annual C++ Developer Survey "Lite"

ANSWER CHOICES	RESPONSES	
Artificial intelligence	9.33%	160
Business (e.g., B2B, B2E)	19.53%	335
Communications (e.g., networking, email)	23.56%	404
Consumer (e.g., retail websites, mobile apps)	11.84%	203
Developer tools (e.g., compilers, code editors)	26.65%	457
Engineering (e.g., avionics, power management)	30.38%	521
Entertainment (e.g., sports apps, video streaming)	9.04%	155
Financial (e.g., trading, mortgage, asset management)	10.26%	176
Frameworks (e.g., React, Unity)	12.83%	220
Gaming (e.g., console and mobile games)	25.60%	439
Hardware/IoT (e.g., embedded systems, home automation)	30.26%	519
Machine learning	9.68%	166
Productivity (e.g., budget tracking, note taking)	7.93%	136
Social and business networking (e.g., Facebook, Twitter)	1.22%	21
Utility apps (e.g., calculators, simple image editors)	22.74%	390
Other (please specify)	16.97%	291
Total Respondents: 1,715		

### Q5 What platforms do you develop for? (select all that apply)

Answered: 1,720 Skipped: 6

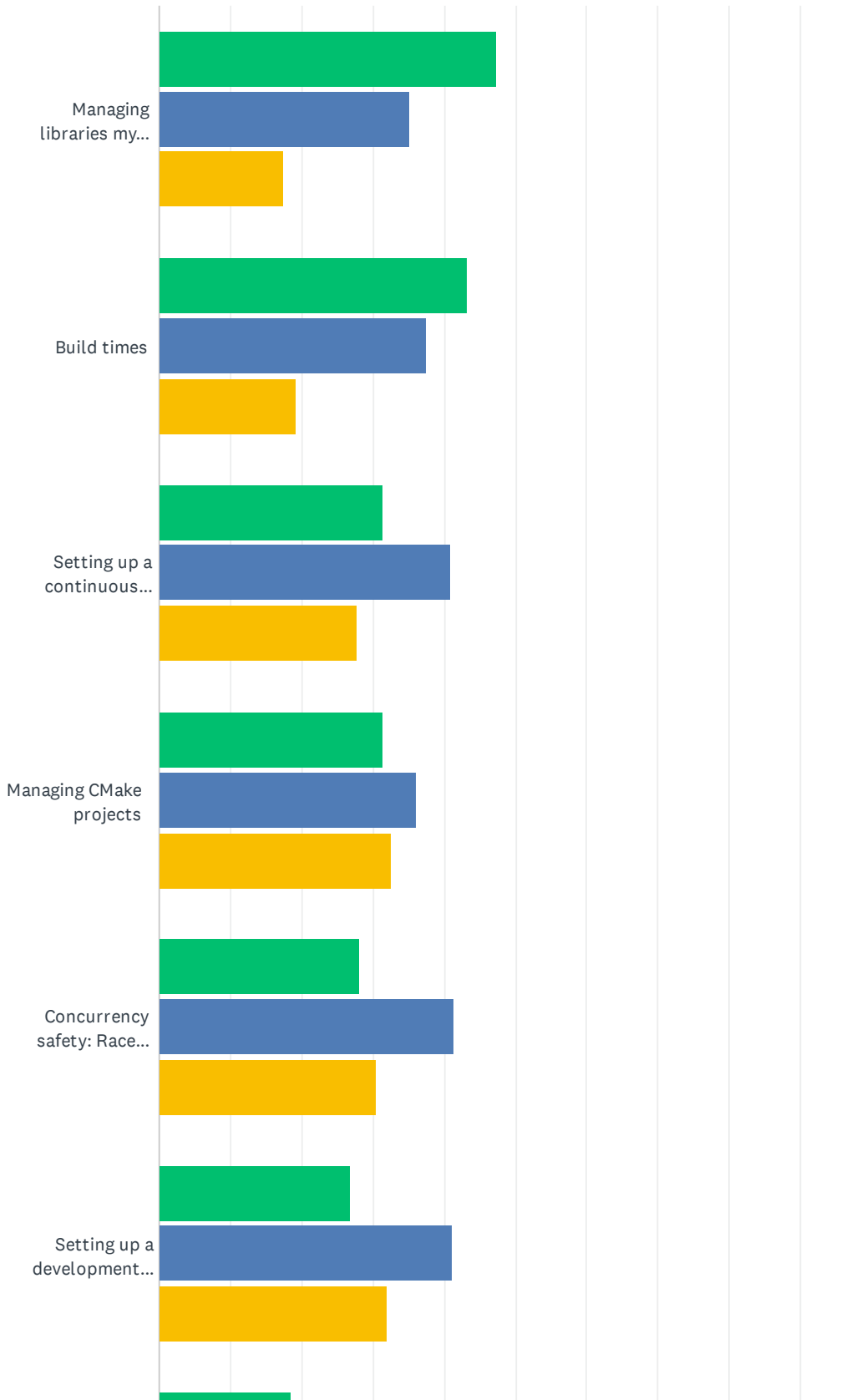


## 2023 Annual C++ Developer Survey "Lite"

ANSWER CHOICES	RESPONSES	
Android	16.10%	277
iOS	11.16%	192
Cloud	10.47%	180
Embedded system	31.74%	546
Game console	8.20%	141
Mac	24.36%	419
Linux desktop	54.19%	932
Linux server	52.44%	902
Windows desktop	67.38%	1,159
Windows server	22.50%	387
Other (please specify)	4.01%	69
Total Respondents: 1,720		

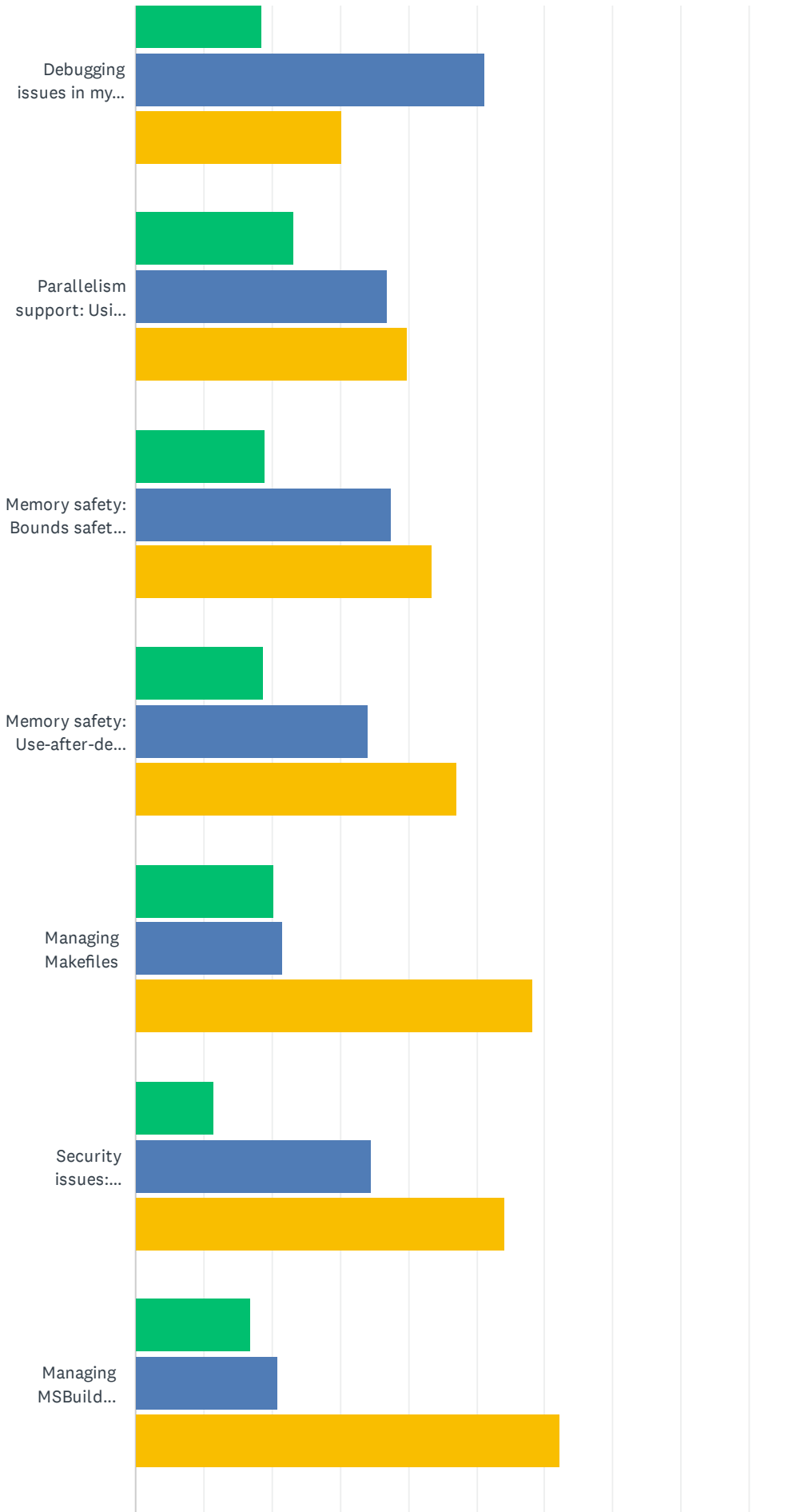
# Q6 Which of these do you find frustrating about C++ development?

Answered: 1,721 Skipped: 5

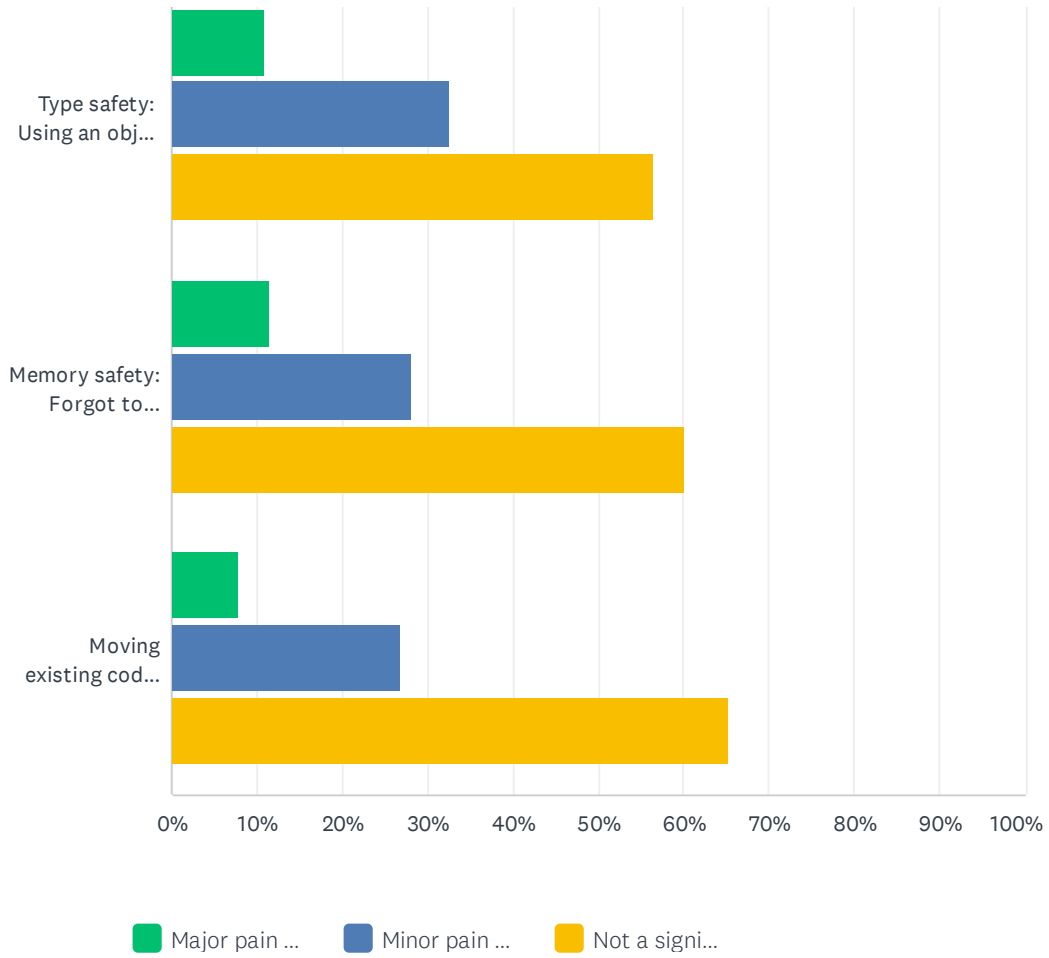




# 2023 Annual C++ Developer Survey "Lite"



# 2023 Annual C++ Developer Survey "Lite"

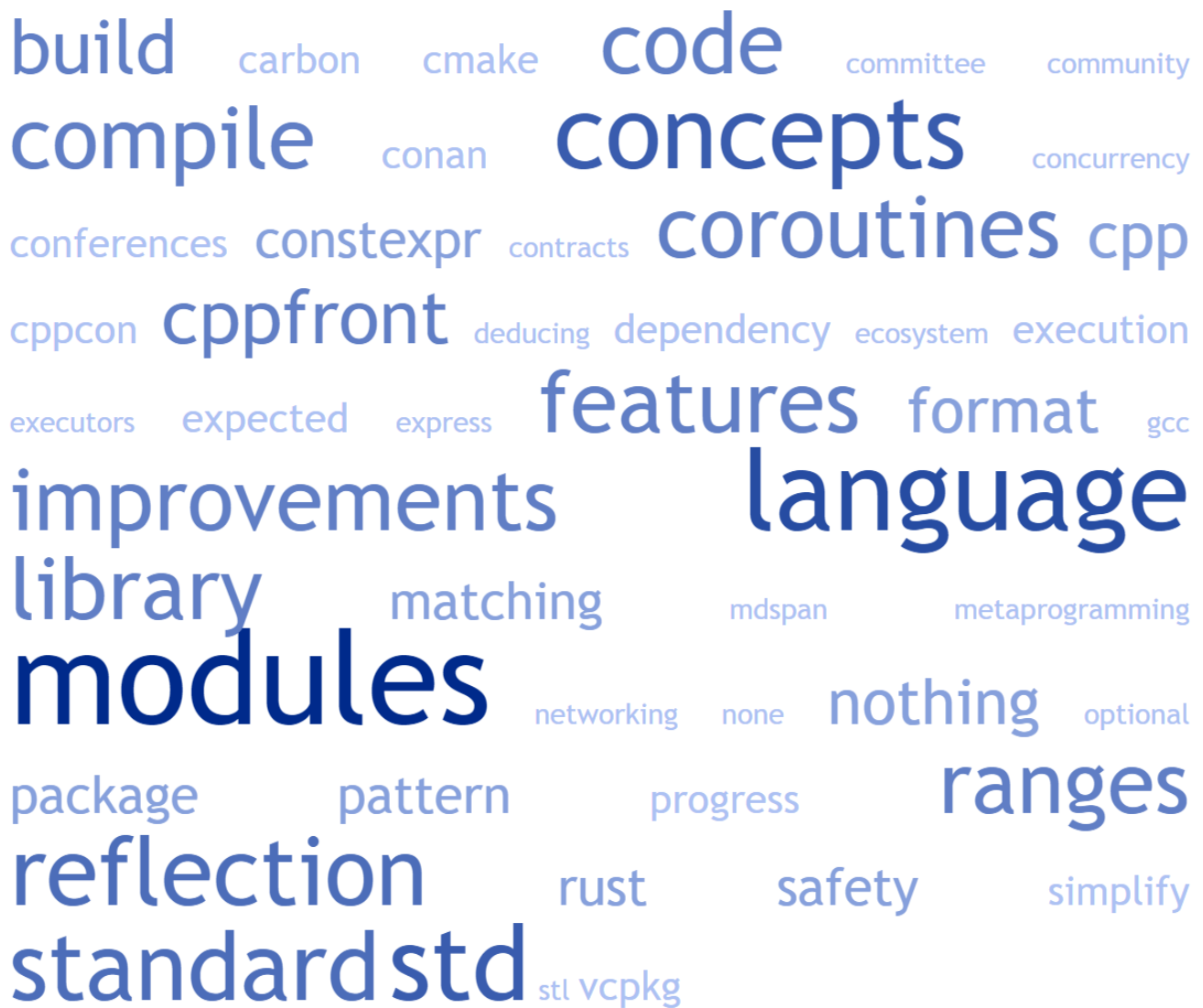


## 2023 Annual C++ Developer Survey "Lite"

	MAJOR PAIN POINT	MINOR PAIN POINT	NOT A SIGNIFICANT ISSUE FOR ME	TOTAL	WEIGHTED AVERAGE
Managing libraries my application depends on	47.37% 810	35.09% 600	17.54% 300	1,710	2.30
Build times	43.34% 735	37.56% 637	19.10% 324	1,696	2.24
Setting up a continuous integration pipeline from scratch (automated builds, tests, ...)	31.35% 531	40.85% 692	27.80% 471	1,694	2.04
Managing CMake projects	31.24% 527	36.10% 609	32.66% 551	1,687	1.99
Concurrency safety: Races, deadlocks, performance bottlenecks	28.17% 480	41.37% 705	30.46% 519	1,704	1.98
Setting up a development environment from scratch (compiler, build system, IDE, ...)	26.83% 459	41.09% 703	32.09% 549	1,711	1.95
Debugging issues in my code	18.52% 313	51.24% 866	30.24% 511	1,690	1.88
Parallelism support: Using more CPU/GPU/other cores to compute an answer faster	23.24% 393	36.84% 623	39.92% 675	1,691	1.83
Memory safety: Bounds safety issues (read/write beyond the bounds of an object or array)	18.92% 323	37.55% 641	43.53% 743	1,707	1.75
Memory safety: Use-after-delete/free (dangling pointers, iterators, spans, ...)	18.83% 321	34.13% 582	47.04% 802	1,705	1.72
Managing Makefiles	20.21% 333	21.48% 354	58.31% 961	1,648	1.62
Security issues: Overlaps with "safety" but includes other issues (secret disclosure, vulnerabilities, exploits, ...)	11.42% 193	34.44% 582	54.14% 915	1,690	1.57
Managing MSBuild projects	16.77% 274	20.99% 343	62.24% 1,017	1,634	1.55
Type safety: Using an object as the wrong type (unsafe downcasts, unsafe unions, ...)	10.90% 186	32.69% 558	56.41% 963	1,707	1.54
Memory safety: Forgot to delete/free (memory leaks)	11.60% 198	28.24% 482	60.16% 1,027	1,707	1.51
Moving existing code to the latest language standard	7.92% 135	26.88% 458	65.20% 1,111	1,704	1.43

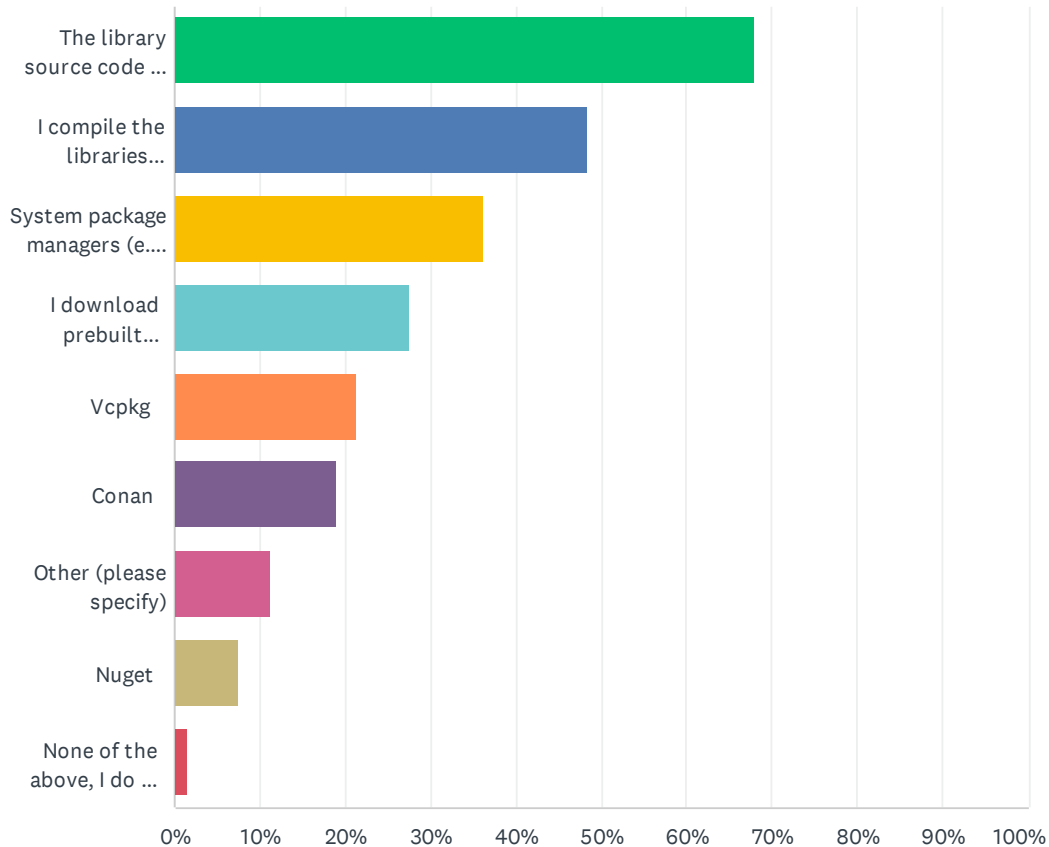
Q7 In the past year, what things in the C++ world (in standards, projects, conferences, articles, etc.) are you most excited about / make you feel positive about C++ and its future? Why?

Answered: 978 Skipped: 748



## Q8 How do you manage your C++ 1st and 3rd party libraries? (Check all that apply)

Answered: 1,706 Skipped: 20

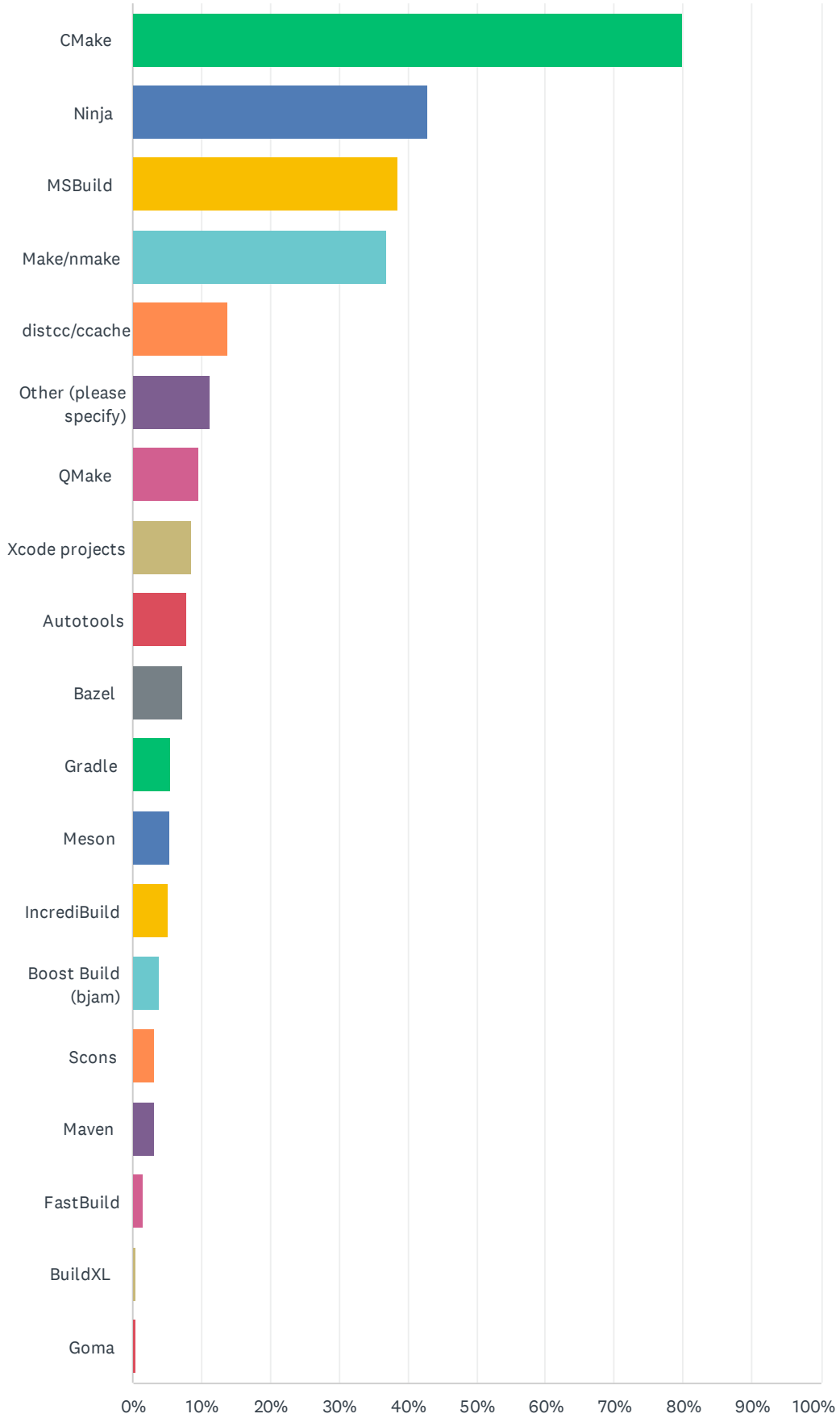


ANSWER CHOICES	RESPONSES	
The library source code is part of my build	68.11%	1,162
I compile the libraries separately using their instructions	48.30%	824
System package managers (e.g., apt, brew, ...)	36.23%	618
I download prebuilt libraries from the Internet	27.43%	468
Vcpkg	21.34%	364
Conan	18.93%	323
Other (please specify)	11.25%	192
Nuget	7.50%	128
None of the above, I do not have any dependencies	1.41%	24
Total Respondents: 1,706		

## Q9 What build tools do you use? (Check all that apply)

Answered: 1,705 Skipped: 21

# 2023 Annual C++ Developer Survey "Lite"



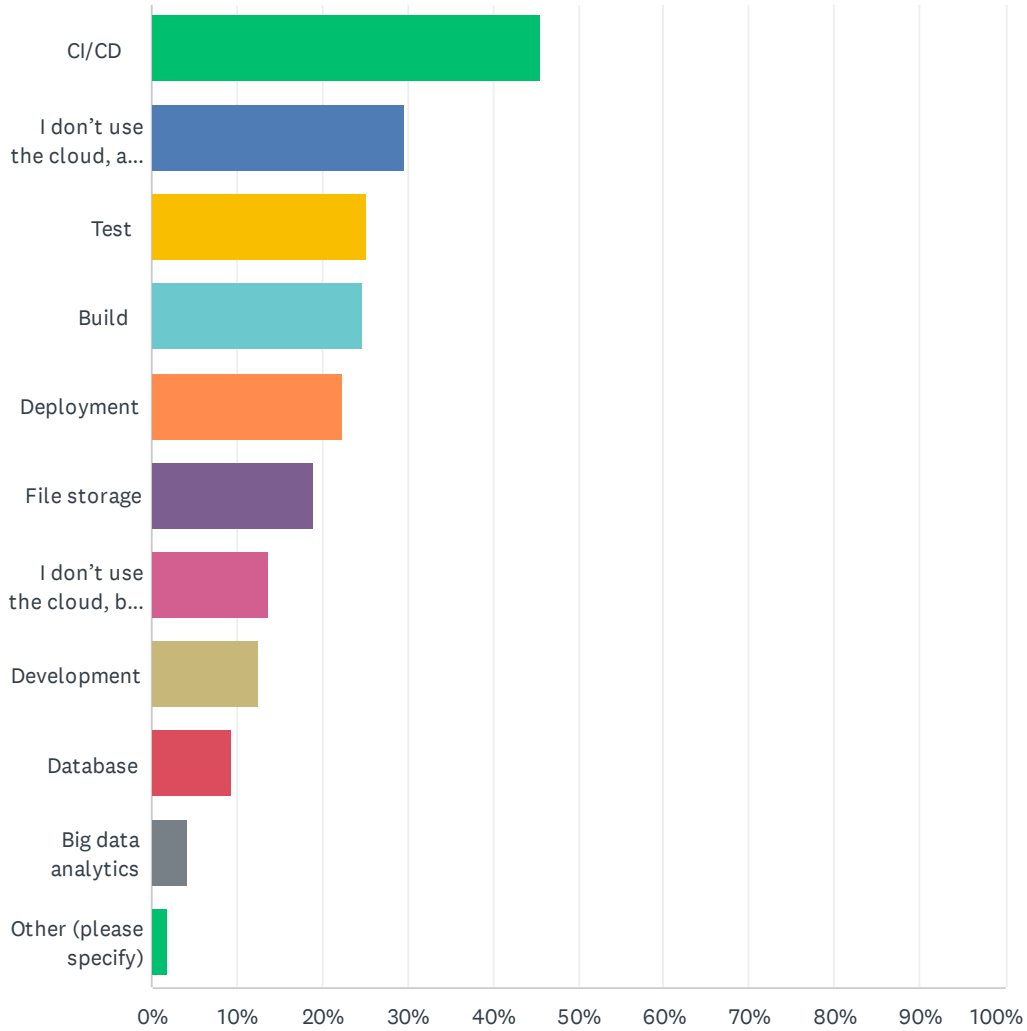
## 2023 Annual C++ Developer Survey "Lite"

ANSWER CHOICES	RESPONSES	
CMake	79.88%	1,362
Ninja	42.93%	732
MSBuild	38.53%	657
Make/nmake	36.89%	629
distcc/ccache	13.96%	238
Other (please specify)	11.38%	194
QMake	9.62%	164
Xcode projects	8.62%	147
Autotools	7.92%	135
Bazel	7.27%	124
Gradle	5.45%	93
Meson	5.28%	90
IncrediBuild	5.10%	87
Boost Build (bjam)	3.81%	65
Scons	3.23%	55
Maven	3.17%	54
FastBuild	1.58%	27
BuildXL	0.47%	8
Goma	0.35%	6
Total Respondents: 1,705		



# Q10 What parts of your development lifecycle use the cloud? (Check all that apply)

Answered: 1,681 Skipped: 45

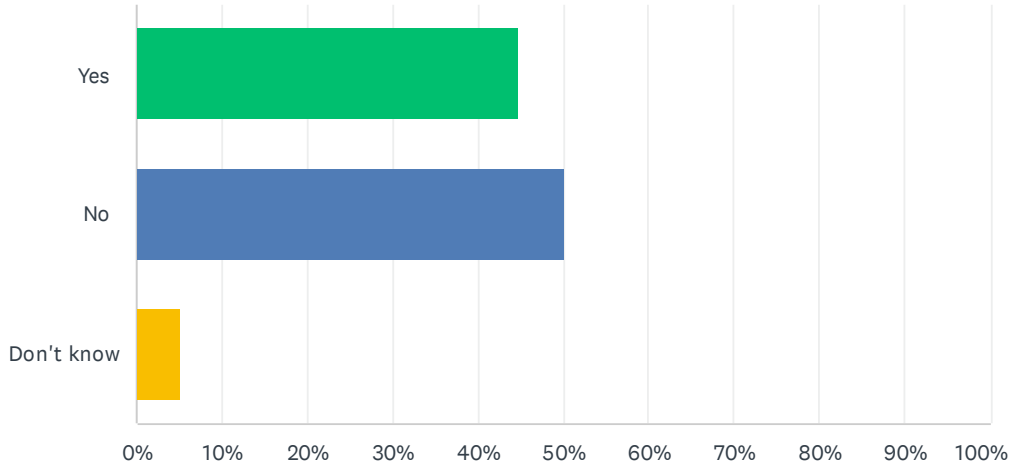


## 2023 Annual C++ Developer Survey "Lite"

ANSWER CHOICES	RESPONSES	
CI/CD	45.69%	768
I don't use the cloud, and I am not interested	29.57%	497
Test	25.10%	422
Build	24.69%	415
Deployment	22.37%	376
File storage	18.92%	318
I don't use the cloud, but I am interested	13.74%	231
Development	12.67%	213
Database	9.28%	156
Big data analytics	4.28%	72
Other (please specify)	2.02%	34
Total Respondents: 1,681		

## Q11 Does your current project use sanitizers and/or fuzzing as part of its normal development and release cycle?

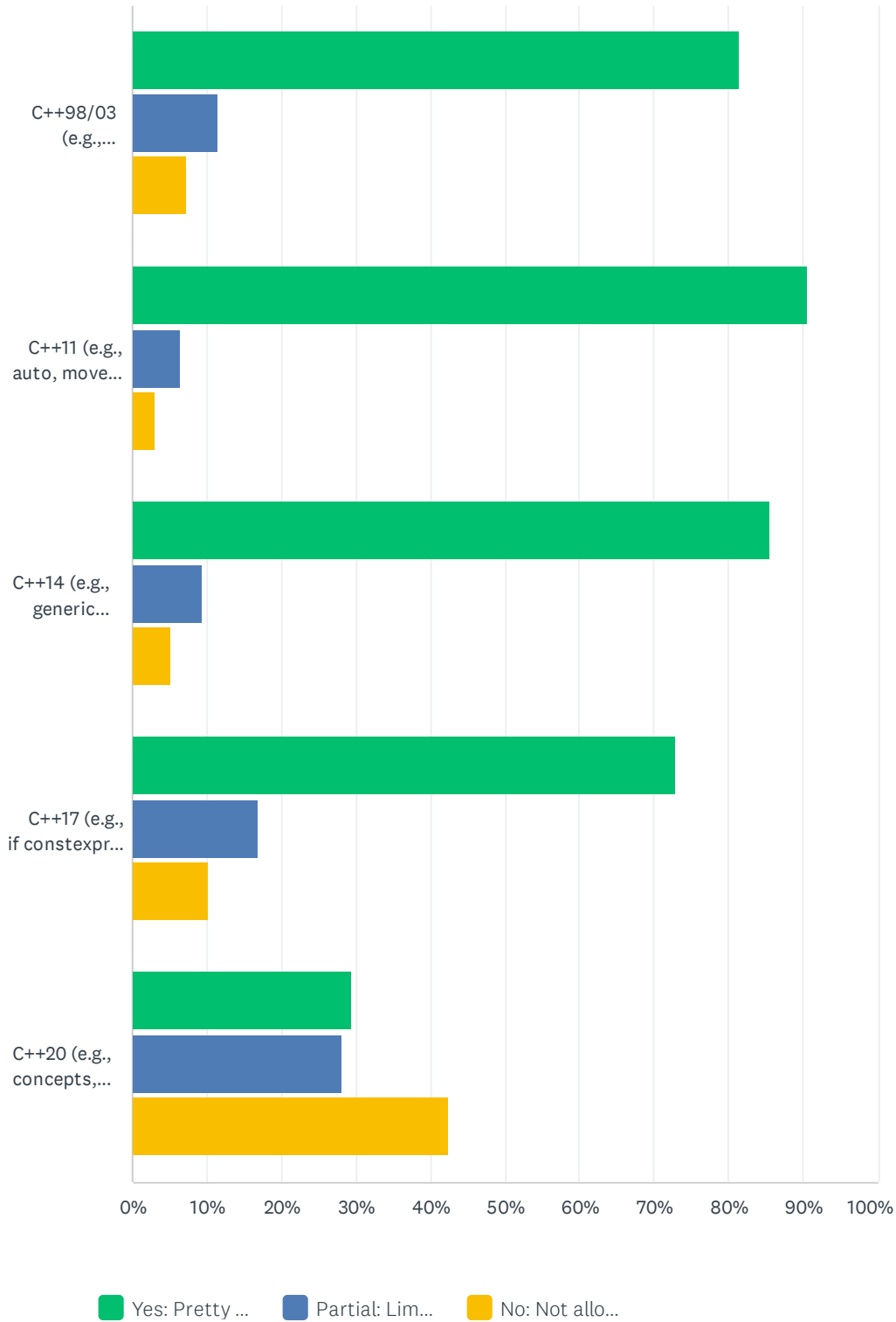
Answered: 1,708 Skipped: 18



ANSWER CHOICES	RESPONSES	
Yes	44.85%	766
No	50.06%	855
Don't know	5.09%	87
<b>TOTAL</b>		<b>1,708</b>

# Q12 What version(s) of C++ are you allowed to use on your current project (work or school)?

Answered: 1,707 Skipped: 19

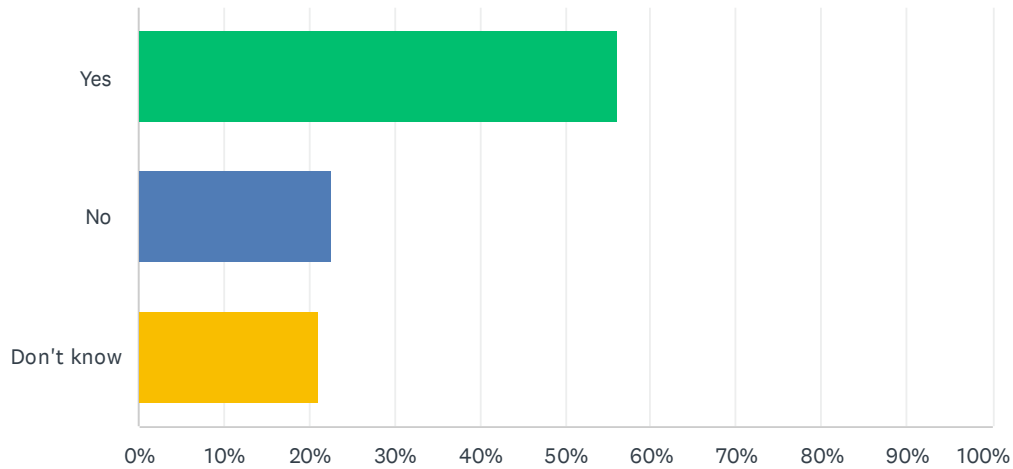


2023 Annual C++ Developer Survey "Lite"

	YES: PRETTY MUCH ALL	PARTIAL: LIMITED FEATURES/USAGE	NO: NOT ALLOWED	TOTAL	WEIGHTED AVERAGE
C++98/03 (e.g., exceptions, templates, RTTI)	81.35% 1,278	11.46% 180	7.19% 113	1,571	2.74
C++11 (e.g., auto, move semantics, =delete/=default, shared_ptr, lambdas)	90.69% 1,452	6.31% 101	3.00% 48	1,601	2.88
C++14 (e.g., generic lambdas, auto return types, general constexpr functions)	85.42% 1,377	9.43% 152	5.15% 83	1,612	2.80
C++17 (e.g., if constexpr, if/switch scoped variables, structured bindings, string_view, optional/any/variant, Parallel STL)	72.91% 1,203	16.79% 277	10.30% 170	1,650	2.63
C++20 (e.g., concepts, coroutines, modules)	29.33% 483	28.17% 464	42.50% 700	1,647	1.87

### Q13 In the next 12 months, does your current project plan to start allowing additional use of newer C++ standard features (i.e., more than in the previous answer)?

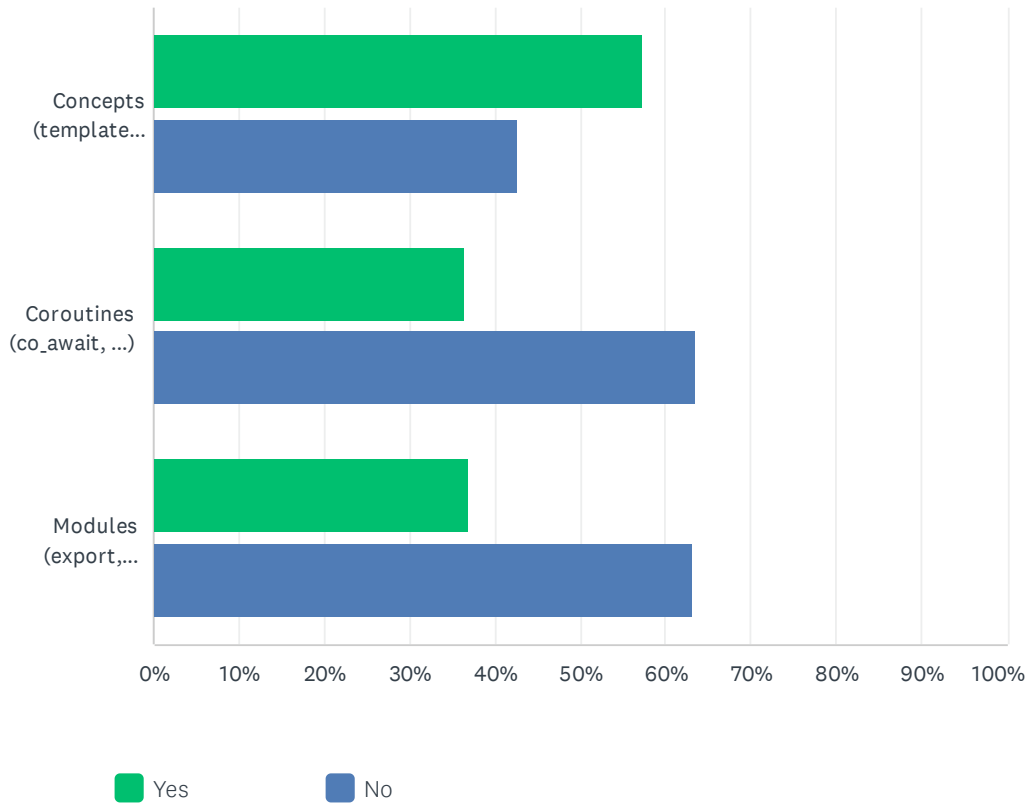
Answered: 1,700 Skipped: 26



ANSWER CHOICES	RESPONSES	
Yes	56.18%	955
No	22.65%	385
Don't know	21.18%	360
<b>TOTAL</b>		<b>1,700</b>

## Q14 Specifically for major C++20/23 features: In the next 12 months, does your current project plan to allow use of these C++20 features in production code?

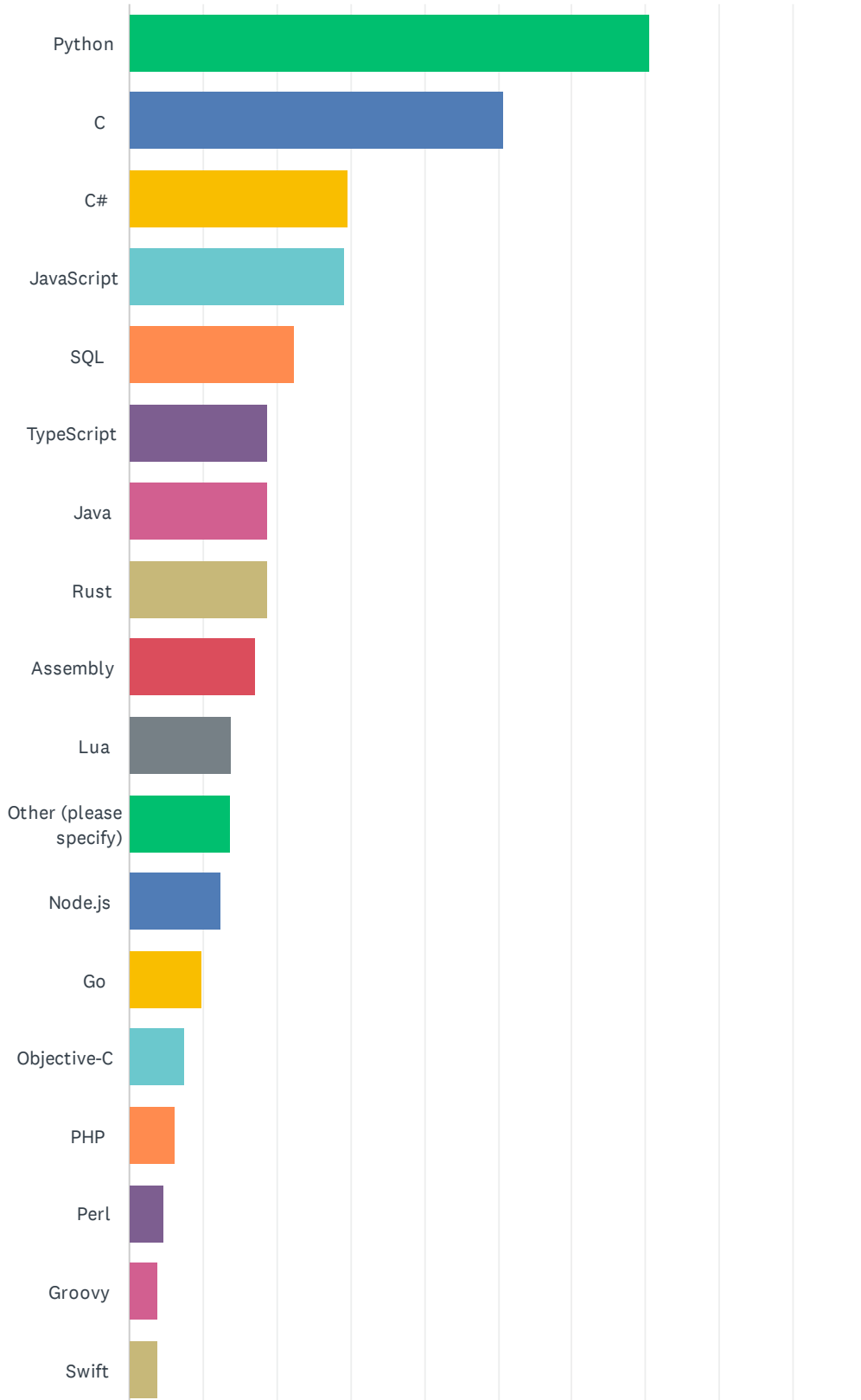
Answered: 1,650 Skipped: 76



	YES	NO	TOTAL	WEIGHTED AVERAGE
Concepts (template constraints, requires, ...)	57.39% 940	42.61% 698	1,638	1.85
Coroutines (co_await, ...)	36.42% 594	63.58% 1,037	1,631	2.27
Modules (export, import, ...)	36.87% 601	63.13% 1,029	1,630	2.26

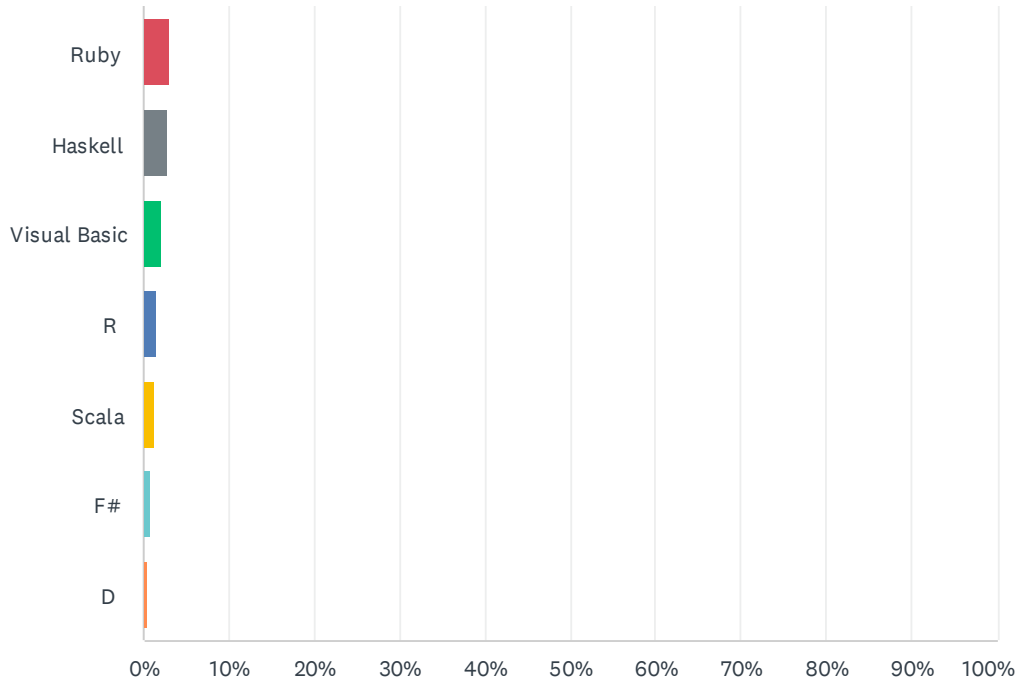
# Q15 Besides C++, what programming languages/environments do you use in your current and recent projects? (select all that apply)

Answered: 1,676 Skipped: 50





# 2023 Annual C++ Developer Survey "Lite"

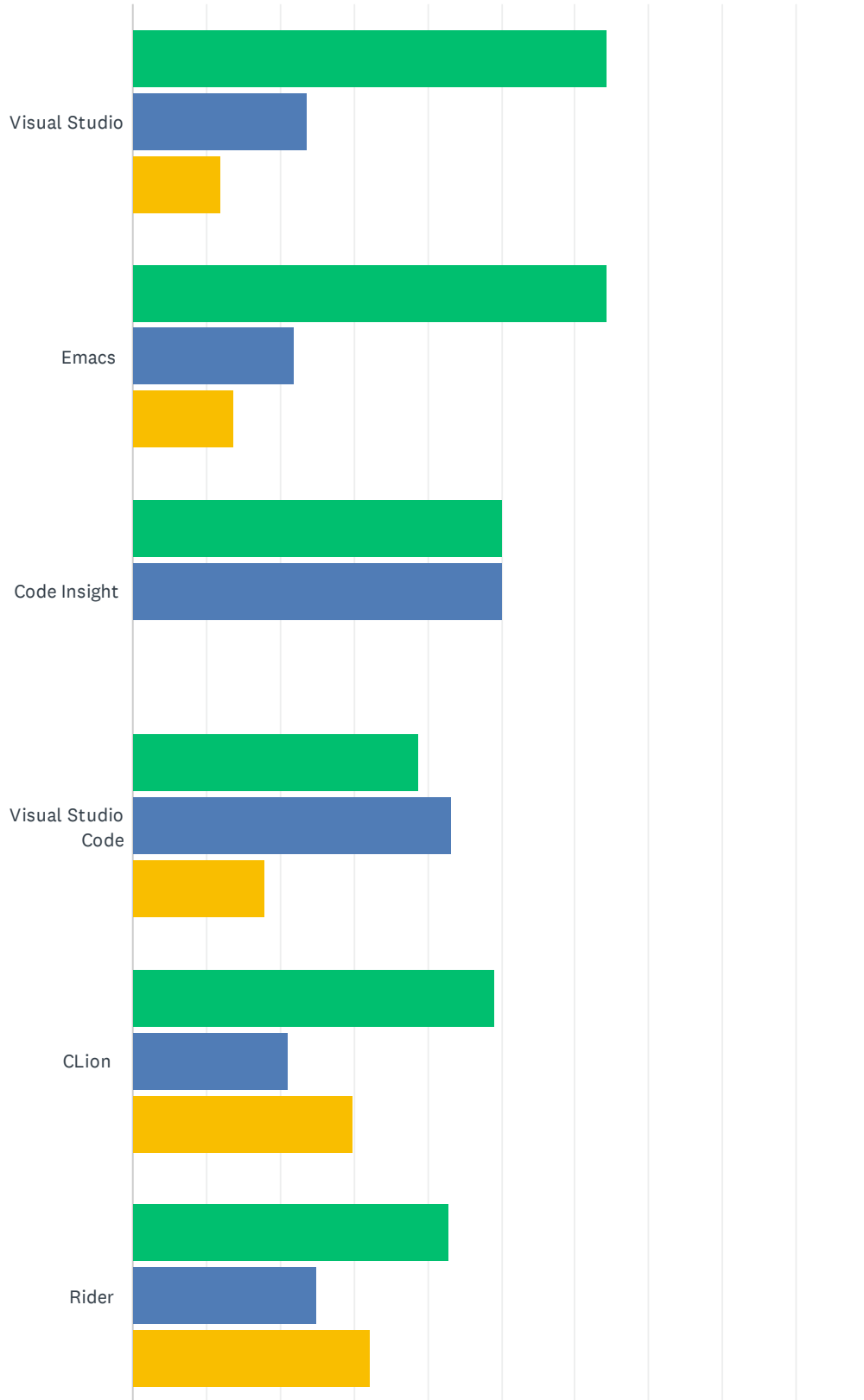


## 2023 Annual C++ Developer Survey "Lite"

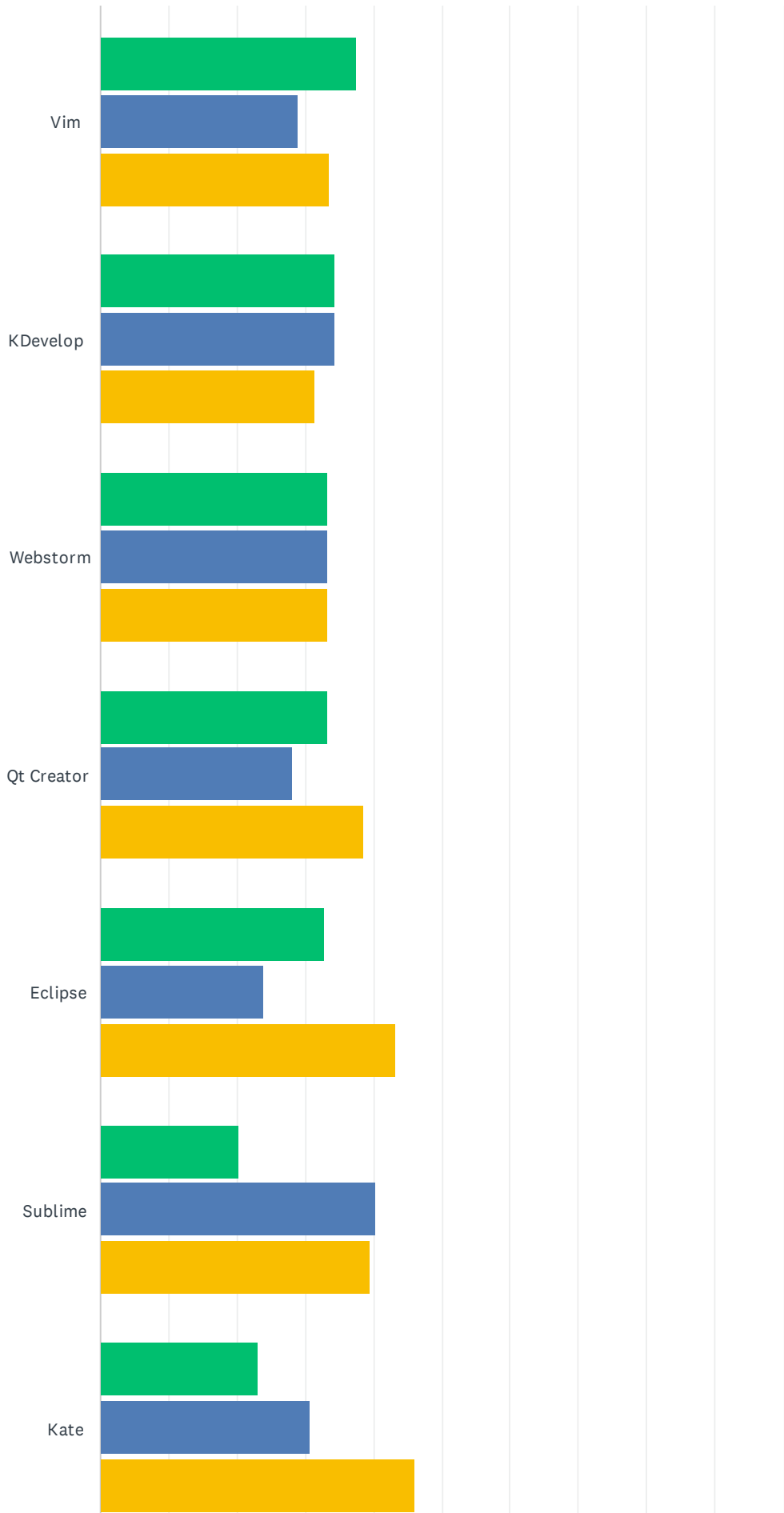
ANSWER CHOICES	RESPONSES	
Python	70.53%	1,182
C	50.78%	851
C#	29.59%	496
JavaScript	29.30%	491
SQL	22.43%	376
TypeScript	18.85%	316
Java	18.74%	314
Rust	18.68%	313
Assembly	17.06%	286
Lua	13.78%	231
Other (please specify)	13.60%	228
Node.js	12.41%	208
Go	9.73%	163
Objective-C	7.46%	125
PHP	6.21%	104
Perl	4.71%	79
Groovy	3.88%	65
Swift	3.88%	65
Ruby	2.98%	50
Haskell	2.86%	48
Visual Basic	2.03%	34
R	1.43%	24
Scala	1.25%	21
F#	0.84%	14
D	0.36%	6
Total Respondents: 1,676		

# Q16 Which development environments (IDEs) or editors do you use for C++ development?

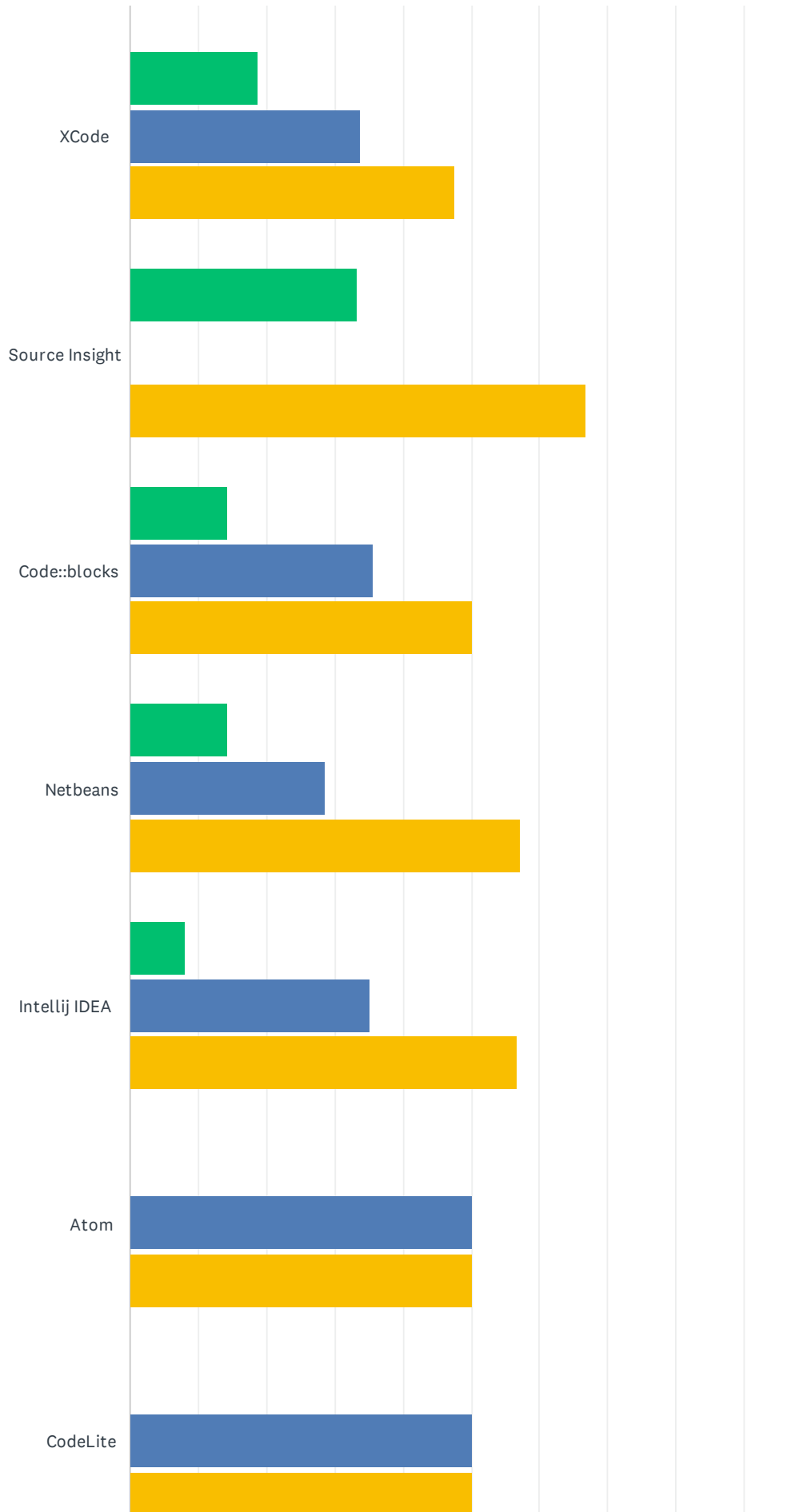
Answered: 1,708 Skipped: 18



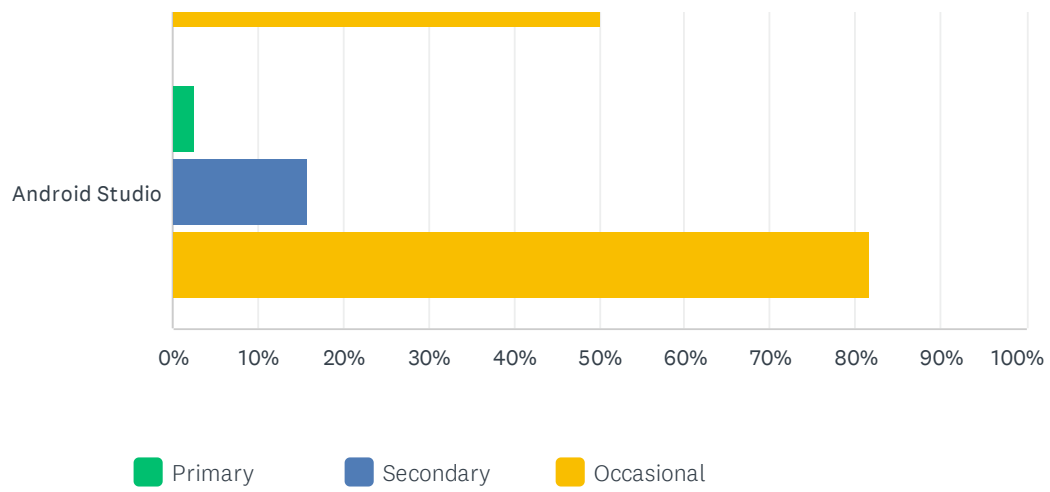
# 2023 Annual C++ Developer Survey "Lite"



# 2023 Annual C++ Developer Survey "Lite"



# 2023 Annual C++ Developer Survey "Lite"

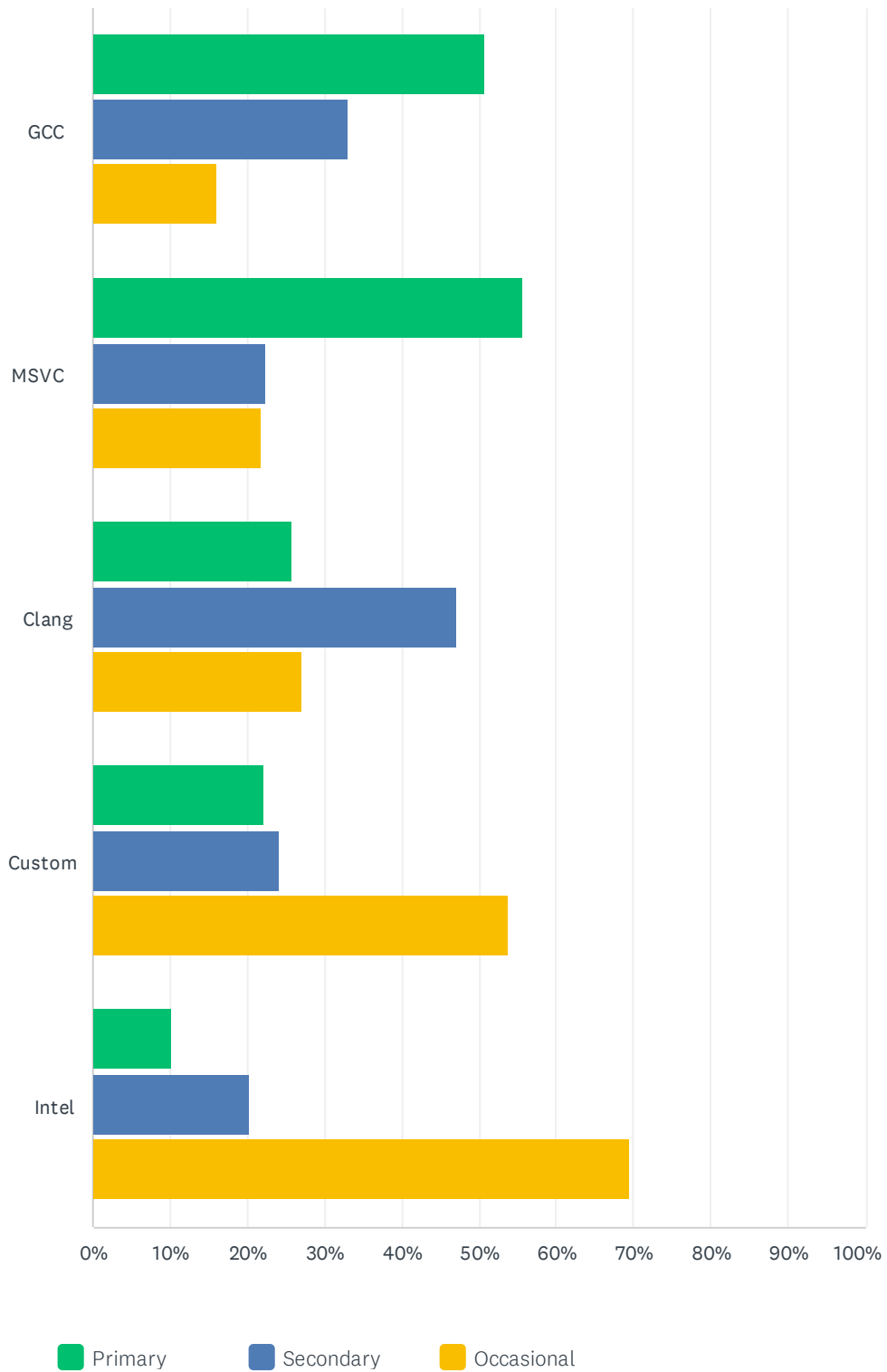


## 2023 Annual C++ Developer Survey "Lite"

	PRIMARY	SECONDARY	OCCASIONAL	TOTAL	WEIGHTED AVERAGE
Visual Studio	64.49% 632	23.67% 232	11.84% 116	980	2.53
Emacs	64.38% 94	21.92% 32	13.70% 20	146	2.51
Code Insight	50.00% 1	50.00% 1	0.00% 0	2	2.50
Visual Studio Code	38.72% 419	43.35% 469	17.93% 194	1,082	2.21
CLion	49.08% 133	21.03% 57	29.89% 81	271	2.19
Rider	42.86% 12	25.00% 7	32.14% 9	28	2.11
Vim	37.50% 192	29.10% 149	33.40% 171	512	2.04
KDevelop	34.38% 11	34.38% 11	31.25% 10	32	2.03
Webstorm	33.33% 1	33.33% 1	33.33% 1	3	2.00
Qt Creator	33.21% 91	28.10% 77	38.69% 106	274	1.95
Eclipse	32.84% 22	23.88% 16	43.28% 29	67	1.90
Sublime	20.20% 20	40.40% 40	39.39% 39	99	1.81
Kate	23.08% 9	30.77% 12	46.15% 18	39	1.77
XCode	18.75% 30	33.75% 54	47.50% 76	160	1.71
Source Insight	33.33% 1	0.00% 0	66.67% 2	3	1.67
Code::blocks	14.29% 2	35.71% 5	50.00% 7	14	1.64
Netbeans	14.29% 1	28.57% 2	57.14% 4	7	1.57
Intellij IDEA	8.11% 3	35.14% 13	56.76% 21	37	1.51
Atom	0.00% 0	50.00% 3	50.00% 3	6	1.50
CodeLite	0.00% 0	50.00% 1	50.00% 1	2	1.50
Android Studio	2.63% 2	15.79% 12	81.58% 62	76	1.21

## Q17 Which compilers do you use for C++ development?

Answered: 1,708 Skipped: 18





## 2023 Annual C++ Developer Survey "Lite"

	PRIMARY	SECONDARY	OCCASIONAL	TOTAL	WEIGHTED AVERAGE
GCC	50.84% 695	33.14% 453	16.02% 219	1,367	2.35
MSVC	55.70% 650	22.45% 262	21.85% 255	1,167	2.34
Clang	25.78% 337	47.21% 617	27.01% 353	1,307	1.99
Custom	22.22% 12	24.07% 13	53.70% 29	54	1.69
Intel	10.14% 7	20.29% 14	69.57% 48	69	1.41

## Q18 What organizations come to your mind the most when you think about C++? Why?

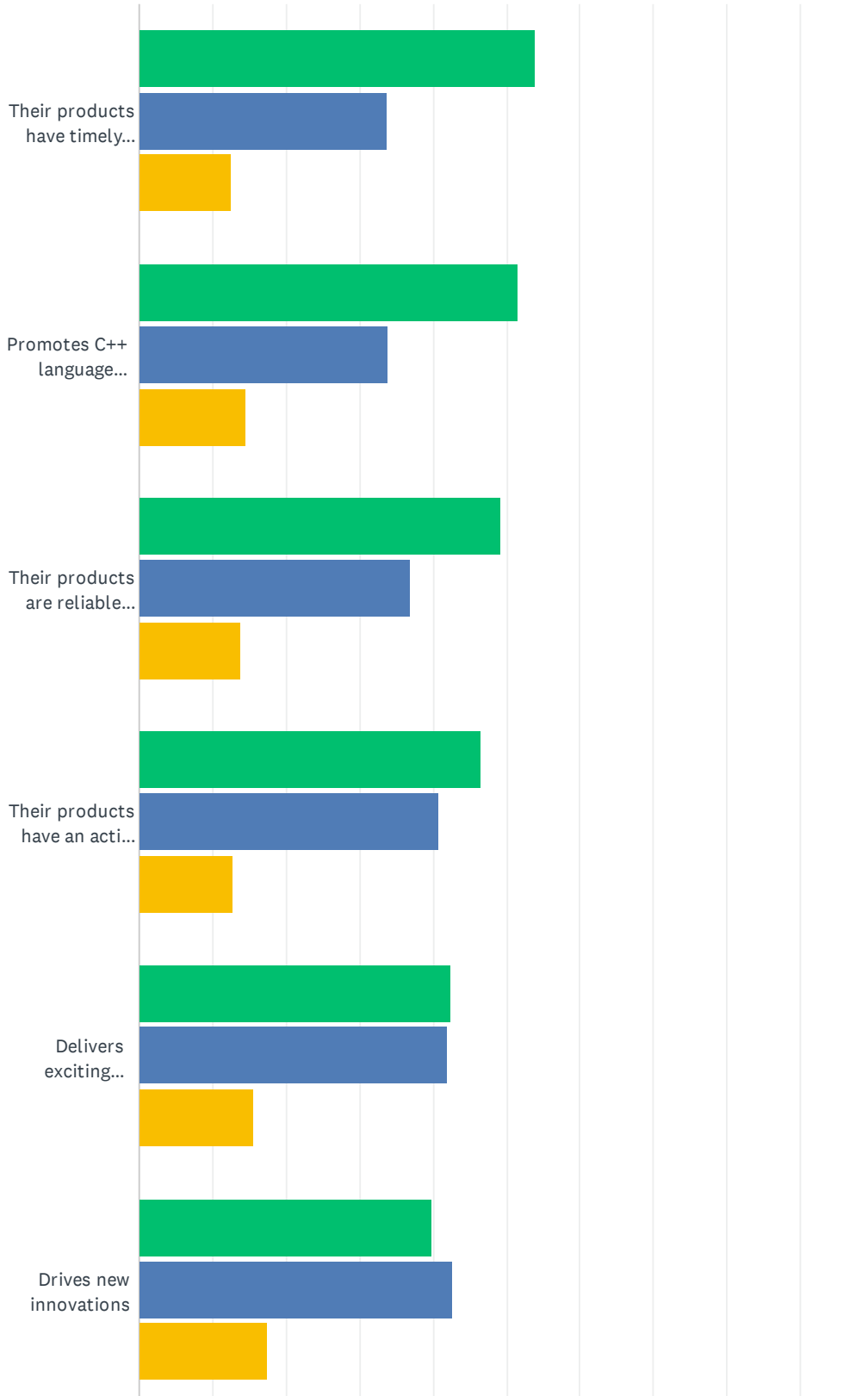
Answered: 887 Skipped: 839

A word cloud of organizations mentioned in the survey. The words are arranged in a roughly rectangular shape, with 'microsoft' and 'google' being the largest and most prominent. Other significant words include 'committee', 'standard', 'iso', 'clang', 'boost', 'apple', 'bloomberg', 'foundation', 'gnu', 'llvm', 'visual', 'studio', 'unreal', 'wg', 'yandex', 'nvidia', 'qt', 'jetbrains', 'kitware', 'meta', 'epic', 'facebook', 'gcc', 'intel', 'abseil', 'accu', 'adobe', 'clang', 'cpp', 'cppcon', 'cpreference', 'ms', 'msvc', 'none', 'stl', and 'yandex'. The words are in various shades of blue and black, with some in bold and some in regular weight.

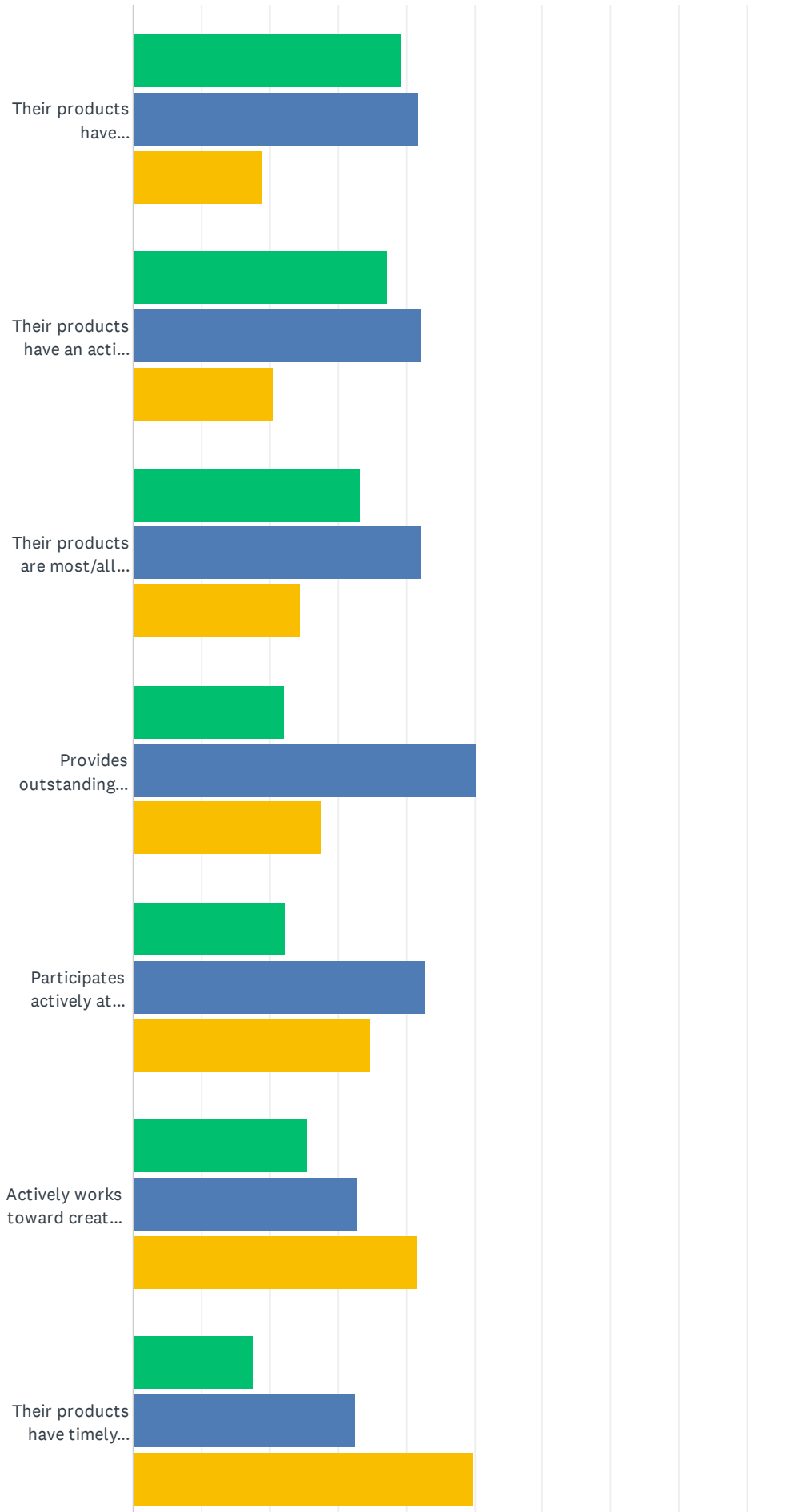
abseil accu adobe apple bloomberg boost  
clang **committee** cpp cppcon cpreference  
epic facebook foundation gcc gnu **google**  
intel **iso** isocpp jetbrains kitware llvm meta  
**microsoft** ms msvc none nvidia qt  
**standard** stl studio unreal visual wg yandex

# Q19 How important is each of these to you when you think about an organization's involvement in C++?

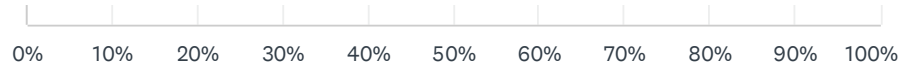
Answered: 1,563 Skipped: 163



# 2023 Annual C++ Developer Survey "Lite"



## 2023 Annual C++ Developer Survey "Lite"

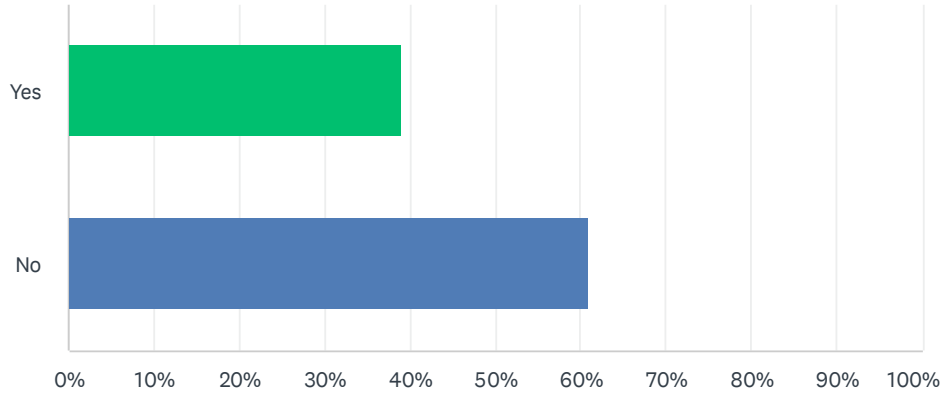


■ Very import...  
 ■ Somewhat i...  
 ■ Not import...

	VERY IMPORTANT	SOMEWHAT IMPORTANT	NOT IMPORTANT	TOTAL	WEIGHTED AVERAGE
Their products have timely support for the latest C++ standard	53.87% 829	33.59% 517	12.54% 193	1,539	2.41
Promotes C++ language evolution in directions that help my work	51.53% 791	33.94% 521	14.53% 223	1,535	2.37
Their products are reliable and backward-compatible	49.15% 752	36.93% 565	13.92% 213	1,530	2.35
Their products have an active user community	46.42% 707	40.71% 620	12.87% 196	1,523	2.34
Delivers exciting solutions to common development problems	42.49% 648	42.03% 641	15.48% 236	1,525	2.27
Drives new innovations	39.88% 605	42.58% 646	17.53% 266	1,517	2.22
Their products have high-quality training materials	39.28% 601	41.76% 639	18.95% 290	1,530	2.20
Their products have an active open source community	37.39% 571	42.24% 645	20.37% 311	1,527	2.17
Their products are most/all open-sourced	33.27% 510	42.27% 648	24.46% 375	1,533	2.09
Provides outstanding customer support and servicing	22.11% 336	50.39% 766	27.50% 418	1,520	1.95
Participates actively at conferences (e.g., talks, booths)	22.41% 342	42.79% 653	34.80% 531	1,526	1.88
Actively works toward creating a more diverse and inclusive C++ community	25.61% 391	32.87% 502	41.52% 634	1,527	1.84
Their products have timely support for the latest C standard	17.65% 269	32.55% 496	49.80% 759	1,524	1.68

## Q20 Is an organization's involvement in the C++ community a major factor in choosing their developer tools and services?

Answered: 1,584 Skipped: 142



ANSWER CHOICES	RESPONSES	
Yes	39.02%	618
No	60.98%	966
TOTAL		1,584

Q21 If you could wave a magic wand and change one thing about any part of C++, what would it be, and how would that change help your daily work?

Answered: 1,176 Skipped: 550

