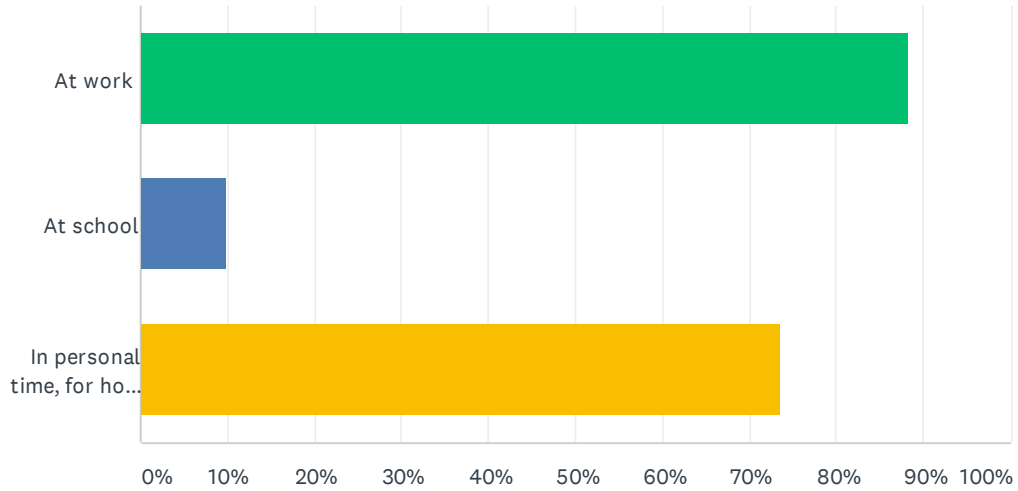


Q1 Where do you use C++? (select all that apply)

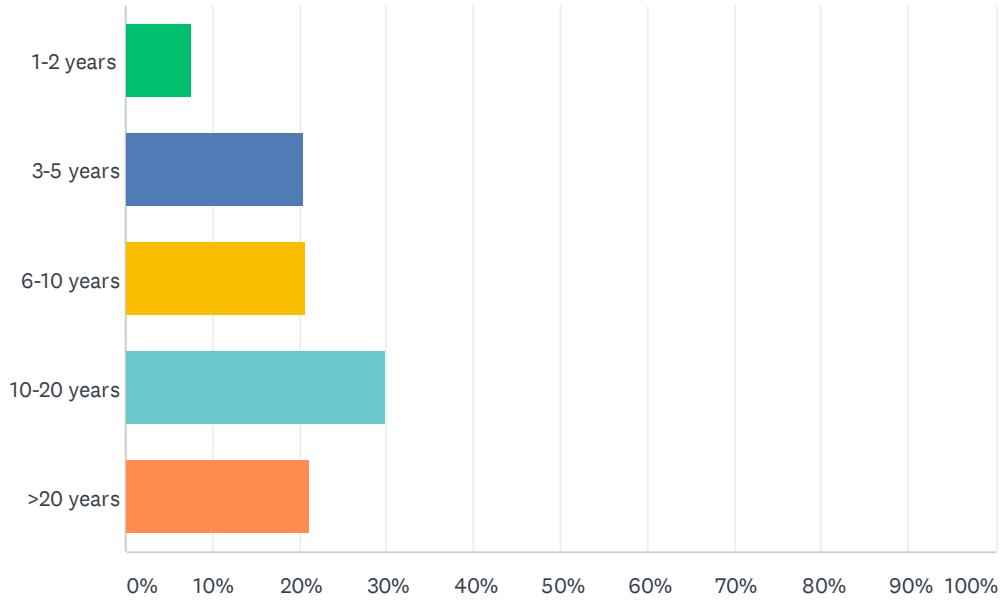
Answered: 1,870 Skipped: 3



ANSWER CHOICES	RESPONSES	
At work	88.29%	1,651
At school	9.79%	183
In personal time, for hobby projects or to try new things	73.74%	1,379
Total Respondents: 1,870		

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

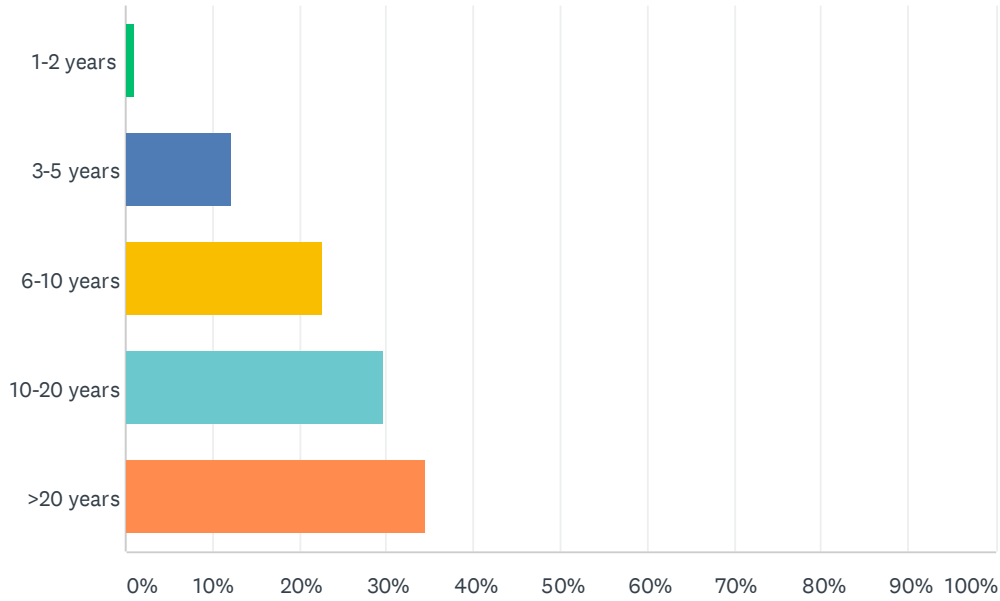
Answered: 1,869 Skipped: 4



ANSWER CHOICES	RESPONSES	
1-2 years	7.60%	142
3-5 years	20.60%	385
6-10 years	20.71%	387
10-20 years	30.02%	561
>20 years	21.08%	394
TOTAL		1,869

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

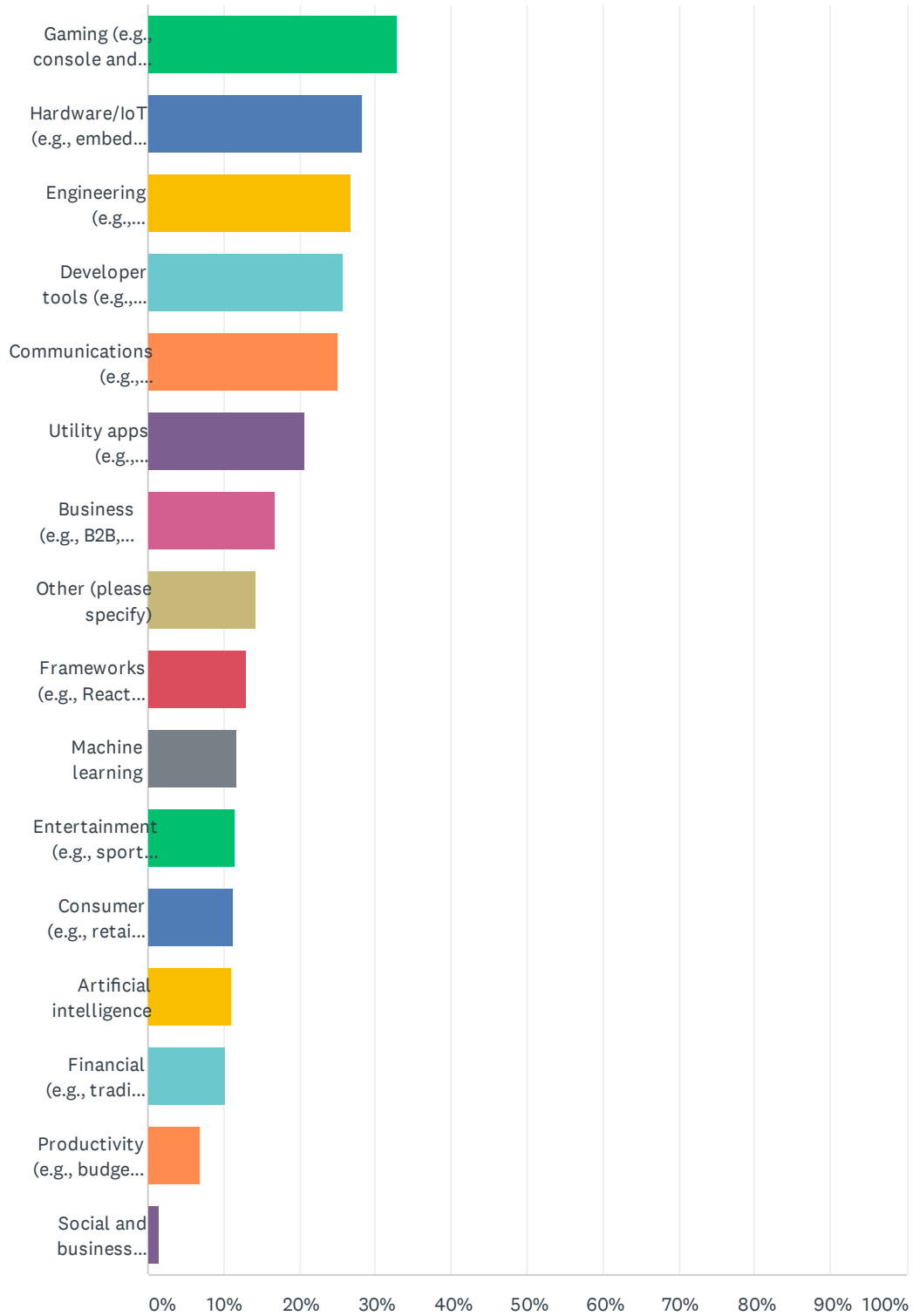
Answered: 1,865 Skipped: 8



ANSWER CHOICES	RESPONSES
1-2 years	1.02% 19
3-5 years	12.17% 227
6-10 years	22.68% 423
10-20 years	29.71% 554
>20 years	34.42% 642
TOTAL	1,865

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

Answered: 1,861 Skipped: 12

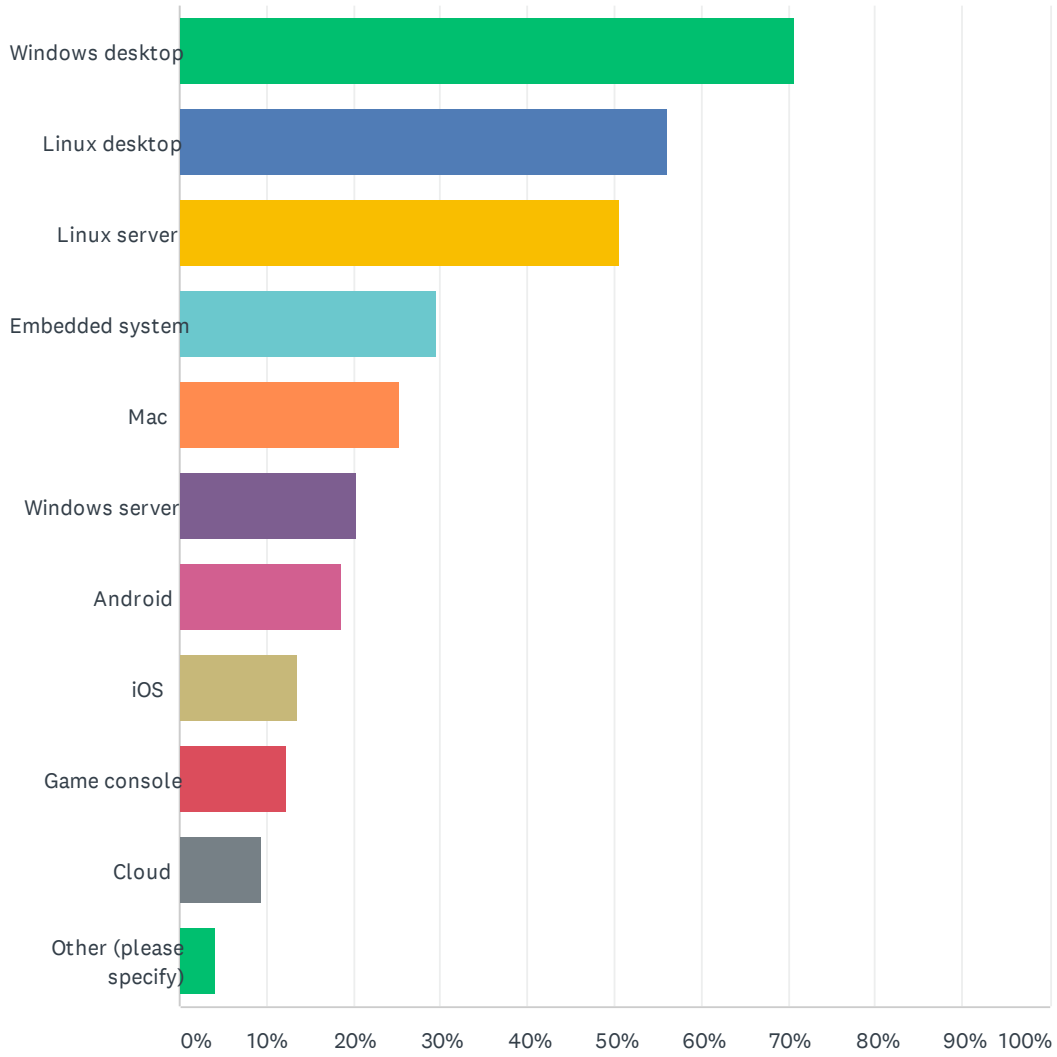


2021 Annual C++ Developer Survey "Lite"

ANSWER CHOICES	RESPONSES	
Gaming (e.g., console and mobile games)	32.89%	612
Hardware/IoT (e.g., embedded systems, home automation)	28.32%	527
Engineering (e.g., avionics, power management)	26.81%	499
Developer tools (e.g., compilers, code editors)	25.74%	479
Communications (e.g., networking, email)	25.09%	467
Utility apps (e.g., calculators, simple image editors)	20.74%	386
Business (e.g., B2B, B2E)	16.82%	313
Other (please specify)	14.24%	265
Frameworks (e.g., React, Unity)	13.00%	242
Machine learning	11.77%	219
Entertainment (e.g., sports apps, video streaming)	11.55%	215
Consumer (e.g., retail websites, mobile apps)	11.39%	212
Artificial intelligence	11.07%	206
Financial (e.g., trading, mortgage, asset management)	10.16%	189
Productivity (e.g., budget tracking, note taking)	6.99%	130
Social and business networking (e.g., Facebook, Twitter)	1.56%	29
Total Respondents: 1,861		

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

Answered: 1,870 Skipped: 3

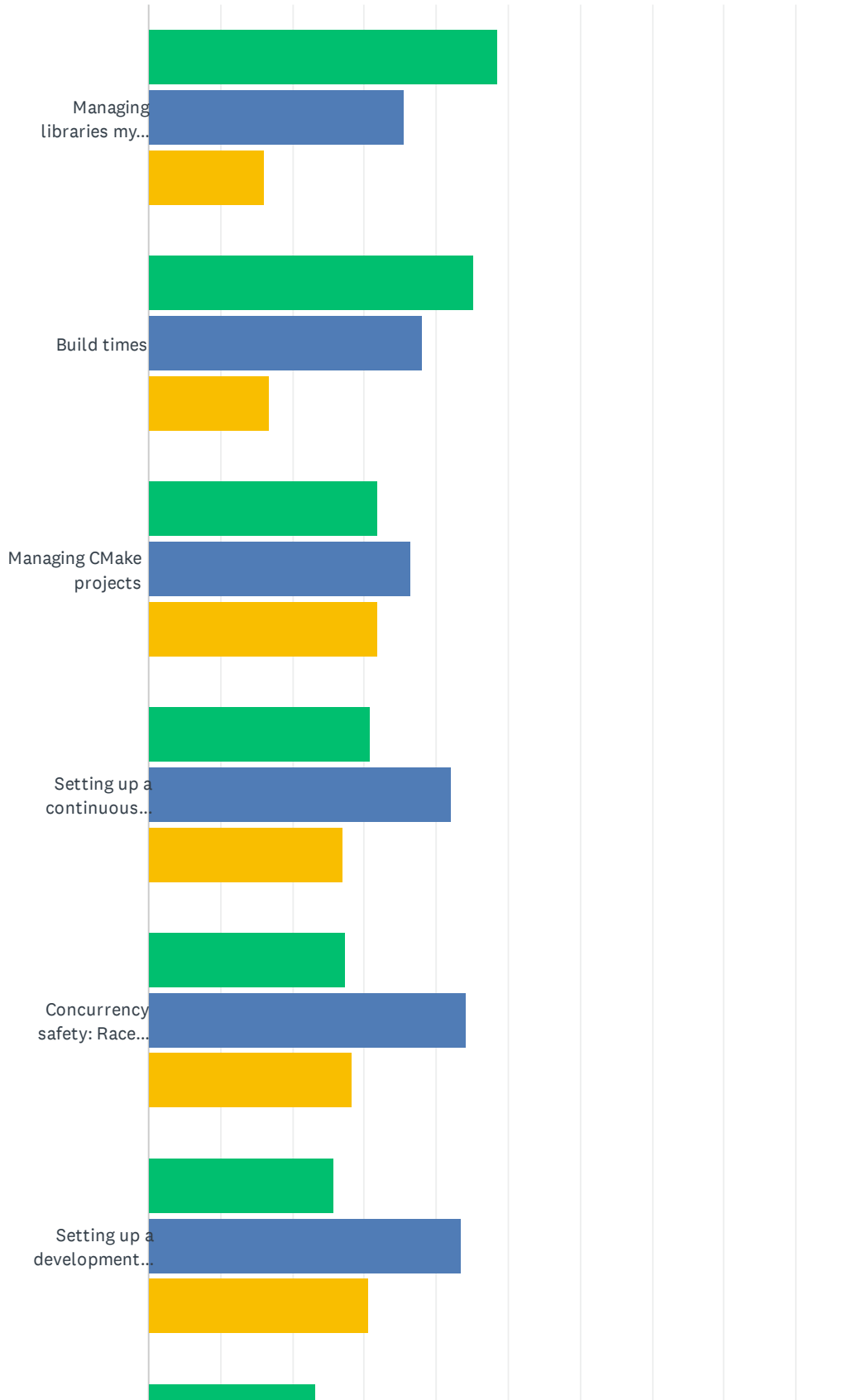


2021 Annual C++ Developer Survey "Lite"

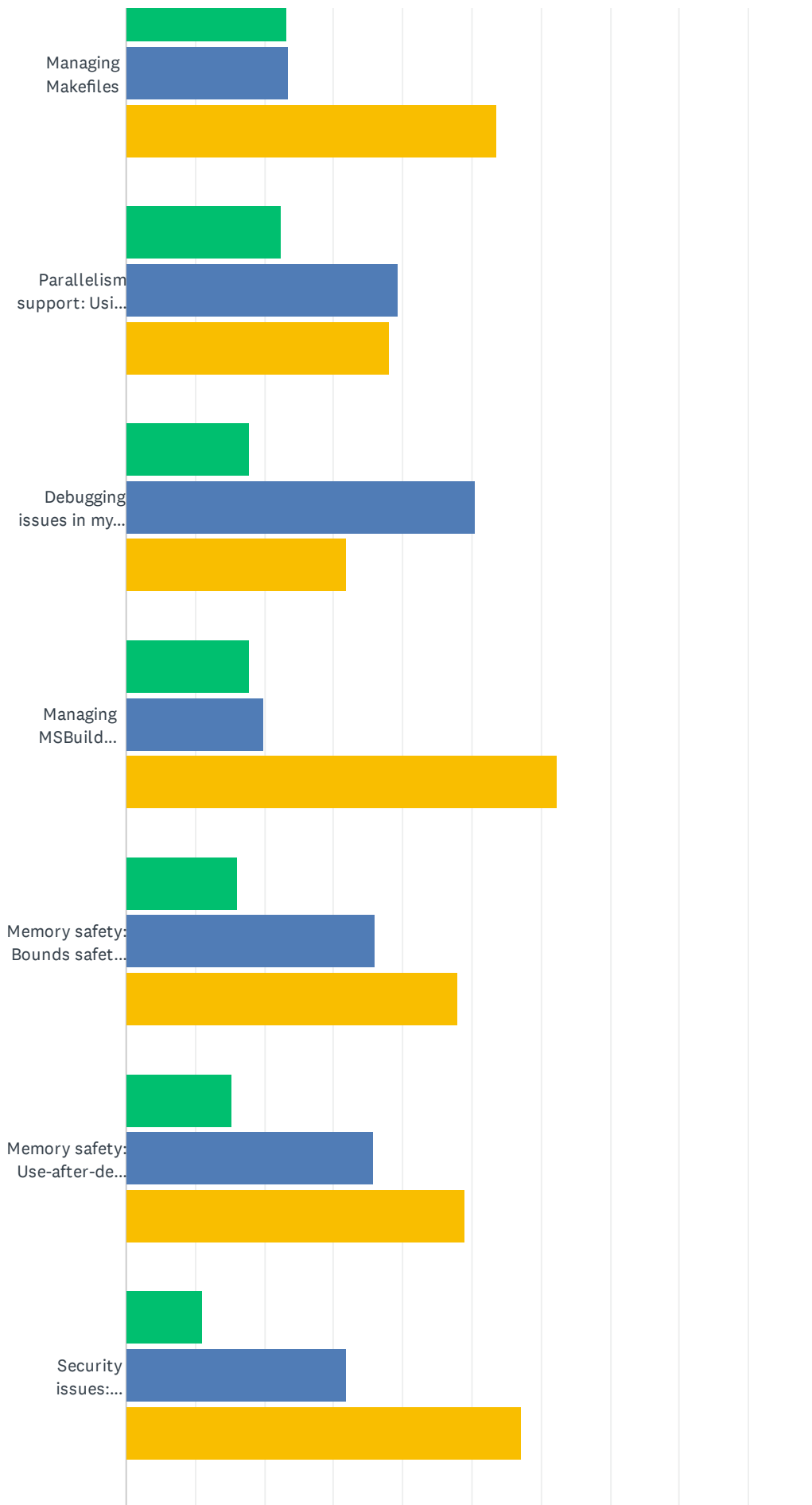
ANSWER CHOICES	RESPONSES	
Windows desktop	70.64%	1,321
Linux desktop	56.10%	1,049
Linux server	50.59%	946
Embedded system	29.41%	550
Mac	25.35%	474
Windows server	20.37%	381
Android	18.56%	347
iOS	13.69%	256
Game console	12.41%	232
Cloud	9.36%	175
Other (please specify)	4.12%	77
Total Respondents: 1,870		

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

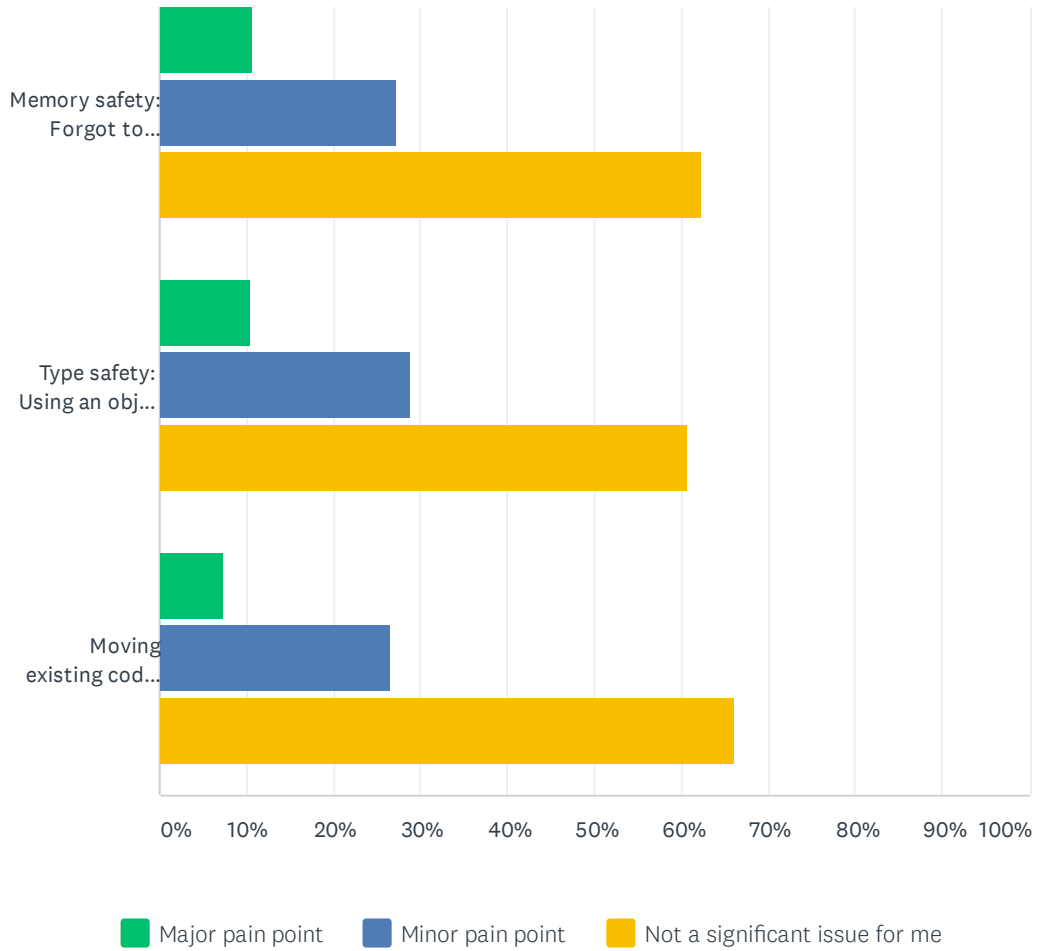
Answered: 1,869 Skipped: 4



2021 Annual C++ Developer Survey "Lite"



2021 Annual C++ Developer Survey "Lite"

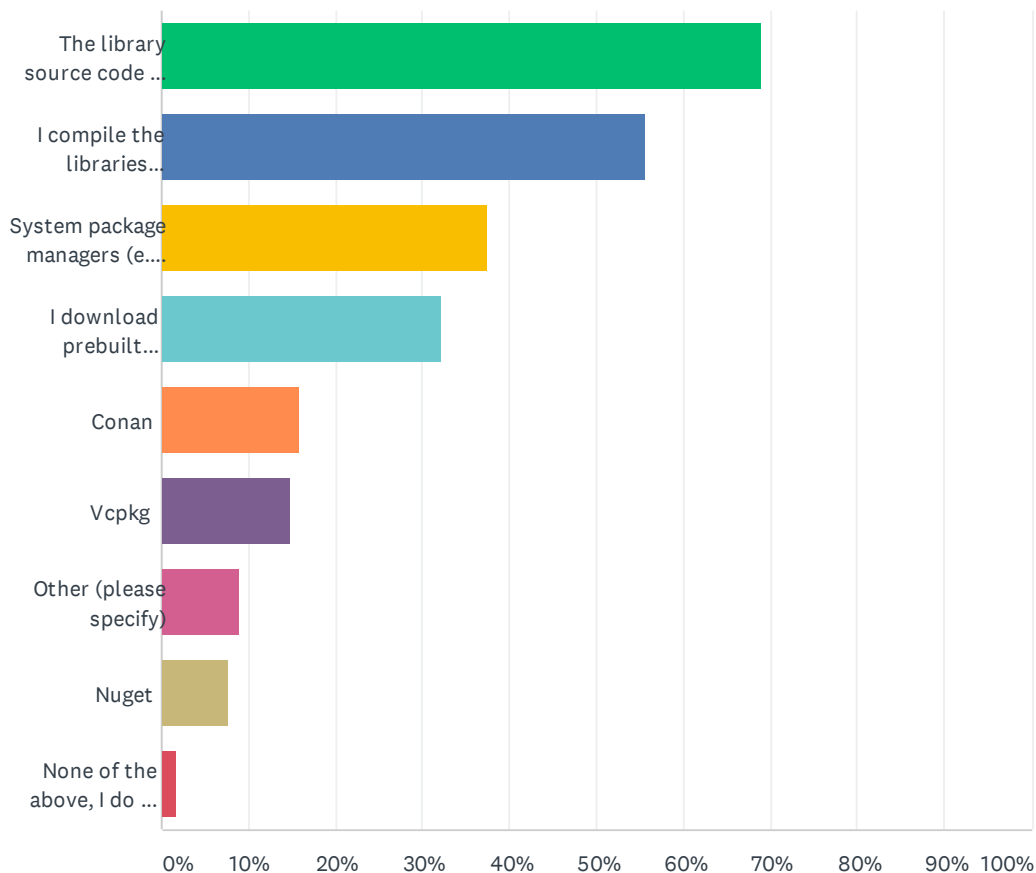


2021 Annual C++ Developer Survey "Lite"

	MAJOR PAIN POINT	MINOR PAIN POINT	NOT A SIGNIFICANT ISSUE FOR ME	TOTAL	WEIGHTED AVERAGE
Managing libraries my application depends on	48.46% 899	35.47% 658	16.06% 298	1,855	2.32
Build times	45.24% 837	38.05% 704	16.70% 309	1,850	2.29
Managing CMake projects	31.88% 587	36.34% 669	31.78% 585	1,841	2.00
Setting up a continuous integration pipeline from scratch (automated builds, tests, ...)	30.85% 568	42.15% 776	27.00% 497	1,841	2.04
Concurrency safety: Races, deadlocks, performance bottlenecks	27.49% 507	44.20% 815	28.31% 522	1,844	1.99
Setting up a development environment from scratch (compiler, build system, IDE, ...)	25.82% 479	43.56% 808	30.62% 568	1,855	1.95
Managing Makefiles	23.16% 416	23.33% 419	53.51% 961	1,796	1.70
Parallelism support: Using more CPU/GPU/other cores to compute an answer faster	22.46% 413	39.37% 724	38.17% 702	1,839	1.84
Debugging issues in my code	17.78% 328	50.46% 931	31.76% 586	1,845	1.86
Managing MSBuild projects	17.86% 320	19.87% 356	62.28% 1,116	1,792	1.56
Memory safety: Bounds safety issues (read/write beyond the bounds of an object or array)	16.17% 300	35.90% 666	47.92% 889	1,855	1.68
Memory safety: Use-after-delete/free (dangling pointers, iterators, spans, ...)	15.21% 282	35.87% 665	48.92% 907	1,854	1.66
Security issues: Overlaps with "safety" but includes other issues (secret disclosure, vulnerabilities, exploits, ...)	11.05% 203	31.74% 583	57.21% 1,051	1,837	1.54
Memory safety: Forgot to delete/free (memory leaks)	10.58% 196	27.11% 502	62.31% 1,154	1,852	1.48
Type safety: Using an object as the wrong type (unsafe downcasts, unsafe unions, ...)	10.50% 194	28.79% 532	60.71% 1,122	1,848	1.50
Moving existing code to the latest language standard	7.36% 136	26.53% 490	66.11% 1,221	1,847	1.41

Q7 How do you manage your C++ 1st and 3rd party libraries? (Check all that apply)

Answered: 1,862 Skipped: 11

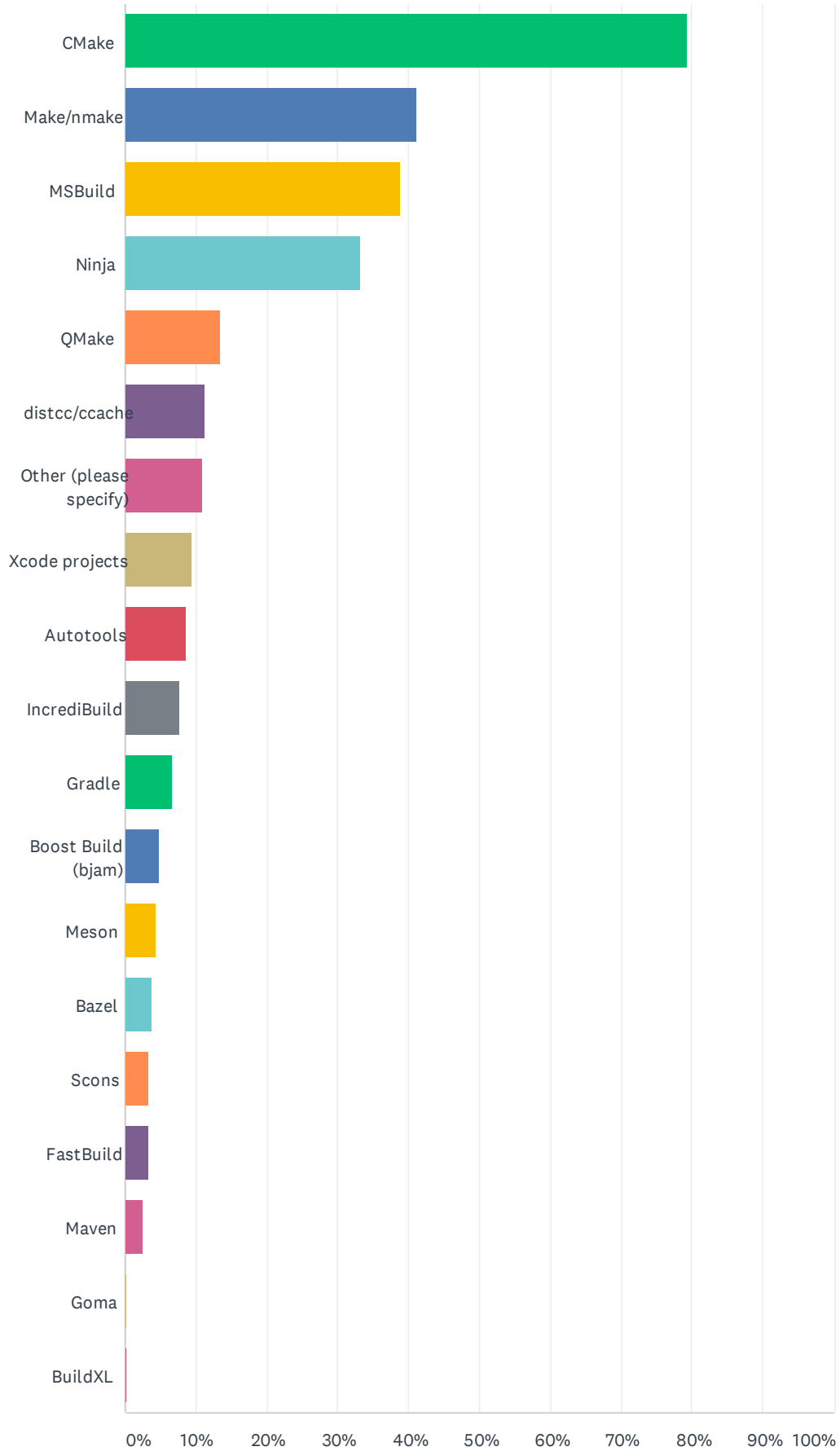


ANSWER CHOICES	RESPONSES	
The library source code is part of my build	68.96%	1,284
I compile the libraries separately using their instructions	55.75%	1,038
System package managers (e.g., apt, brew, ...)	37.49%	698
I download prebuilt libraries from the Internet	32.28%	601
Conan	15.95%	297
Vcpkg	14.82%	276
Other (please specify)	9.02%	168
Nuget	7.84%	146
None of the above, I do not have any dependencies	1.66%	31
Total Respondents: 1,862		

Q8 What build tools do you use? (Check all that apply)

Answered: 1,853 Skipped: 20

2021 Annual C++ Developer Survey "Lite"

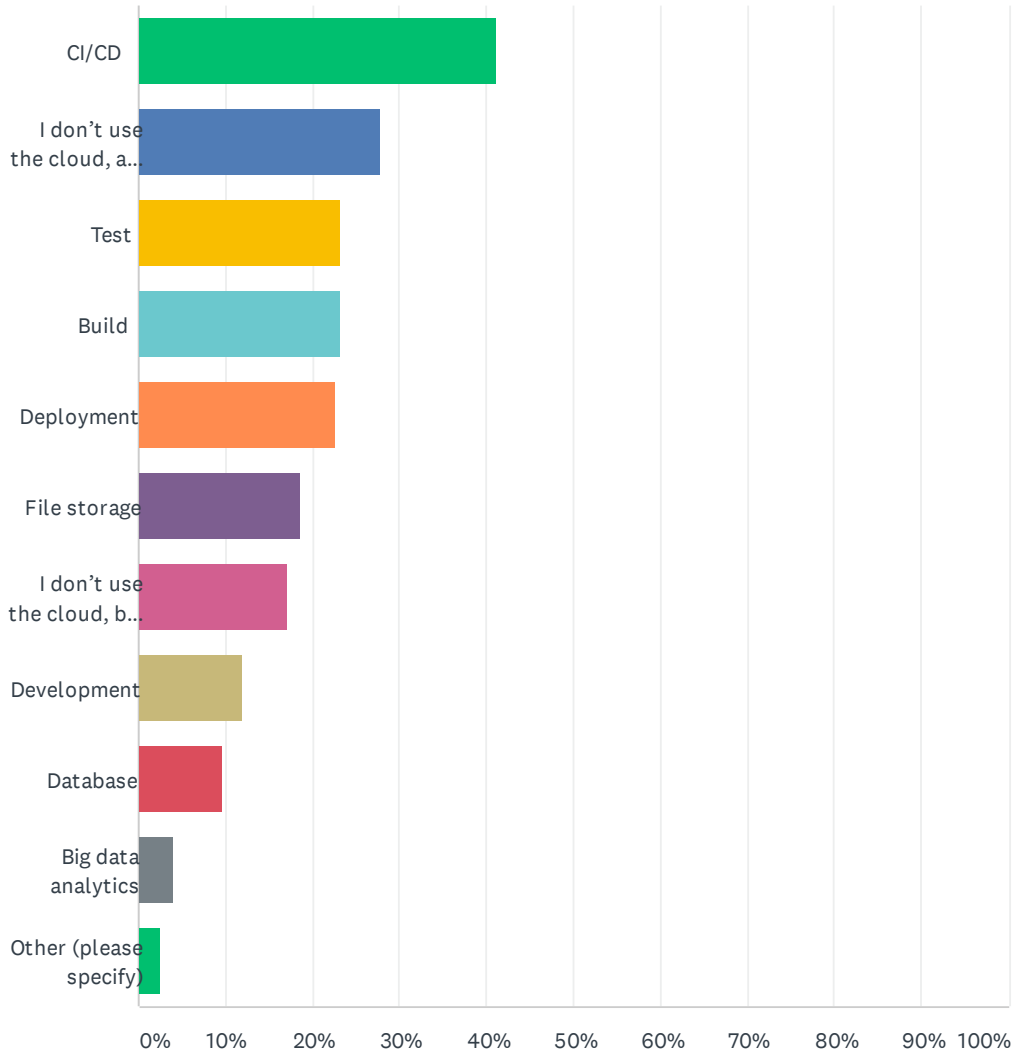


2021 Annual C++ Developer Survey "Lite"

ANSWER CHOICES	RESPONSES	
CMake	79.38%	1,471
Make/nmake	41.23%	764
MSBuild	38.96%	722
Ninja	33.35%	618
QMake	13.33%	247
distcc/ccache	11.23%	208
Other (please specify)	10.85%	201
Xcode projects	9.34%	173
Autotools	8.63%	160
IncrediBuild	7.77%	144
Gradle	6.75%	125
Boost Build (bjam)	4.86%	90
Meson	4.48%	83
Bazel	3.78%	70
Scons	3.35%	62
FastBuild	3.29%	61
Maven	2.54%	47
Goma	0.22%	4
BuildXL	0.11%	2
Total Respondents: 1,853		

Q9 What parts of your development lifecycle use the cloud? (Check all that apply)

Answered: 1,835 Skipped: 38

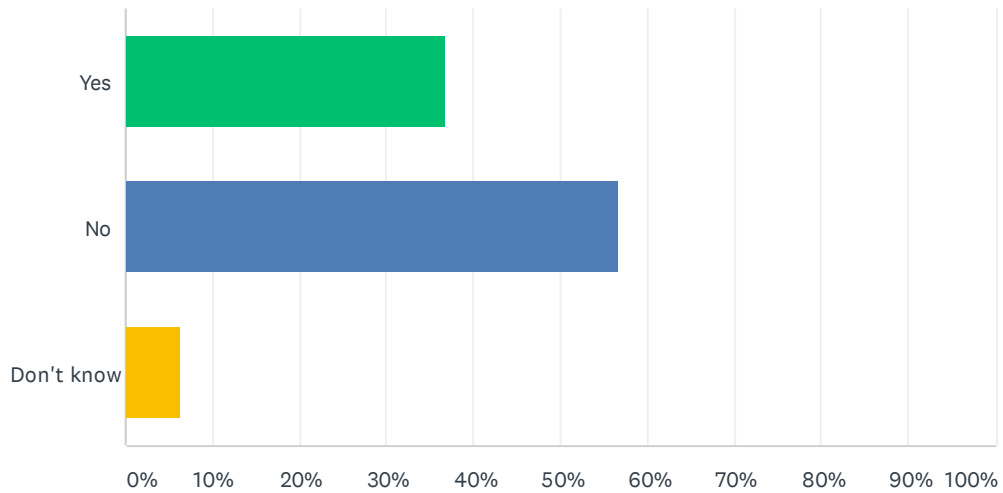


2021 Annual C++ Developer Survey "Lite"

ANSWER CHOICES	RESPONSES	
CI/CD	41.31%	758
I don't use the cloud, and I am not interested	27.74%	509
Test	23.27%	427
Build	23.16%	425
Deployment	22.56%	414
File storage	18.53%	340
I don't use the cloud, but I am interested	17.06%	313
Development	11.88%	218
Database	9.59%	176
Big data analytics	4.03%	74
Other (please specify)	2.45%	45
Total Respondents: 1,835		

Q10 Does your current project use sanitizers and/or fuzzing as part of its normal development and release cycle?

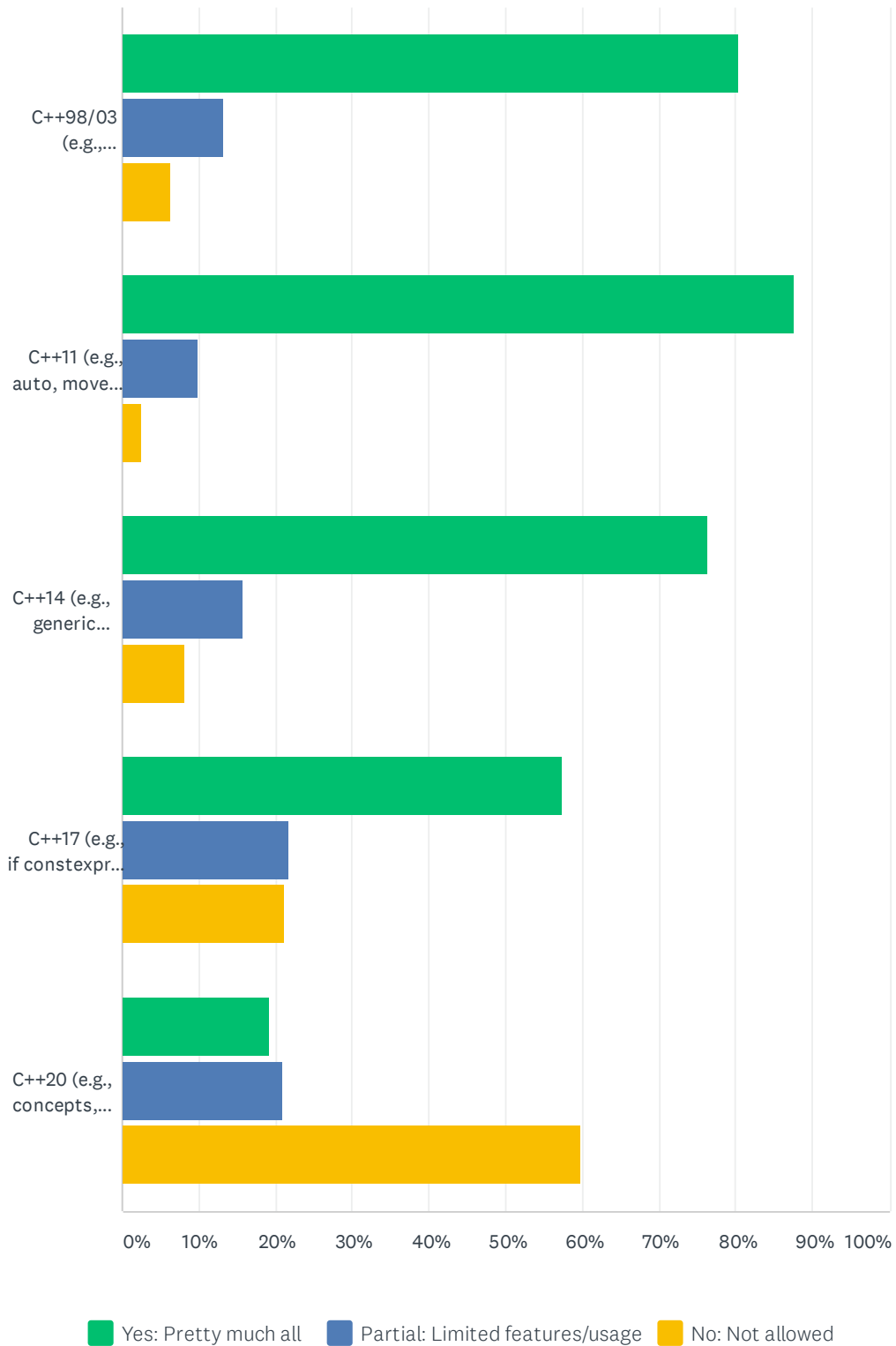
Answered: 1,856 Skipped: 17



ANSWER CHOICES	RESPONSES	
Yes	36.91%	685
No	56.73%	1,053
Don't know	6.36%	118
TOTAL		1,856

Q11 What version(s) of C++ are you allowed to use on your current project (work or school)?

Answered: 1,856 Skipped: 17

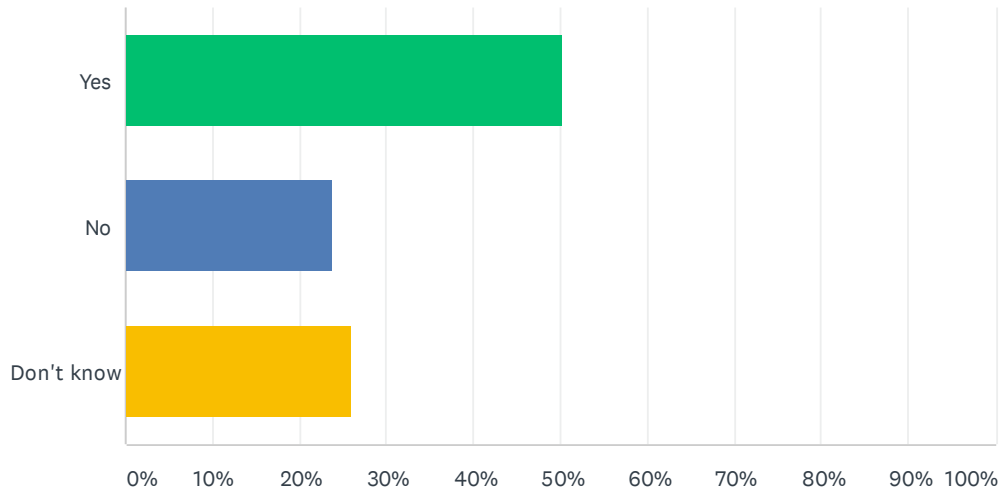


2021 Annual C++ Developer Survey "Lite"

	YES: PRETTY MUCH ALL	PARTIAL: LIMITED FEATURES/USAGE	NO: NOT ALLOWED	TOTAL	WEIGHTED AVERAGE
C++98/03 (e.g., exceptions, templates, RTTI)	80.43% 1,393	13.28% 230	6.29% 109	1,732	2.74
C++11 (e.g., auto, move semantics, =delete/=default, shared_ptr, lambdas)	87.69% 1,553	9.77% 173	2.54% 45	1,771	2.85
C++14 (e.g., generic lambdas, auto return types, general constexpr functions)	76.29% 1,358	15.62% 278	8.09% 144	1,780	2.68
C++17 (e.g., if constexpr, if/switch scoped variables, structured bindings, string_view, optional/any/variant, Parallel STL)	57.23% 1,041	21.72% 395	21.06% 383	1,819	2.36
C++20 (e.g., concepts, coroutines, modules)	19.32% 342	20.90% 370	59.77% 1,058	1,770	1.60

Q12 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)?

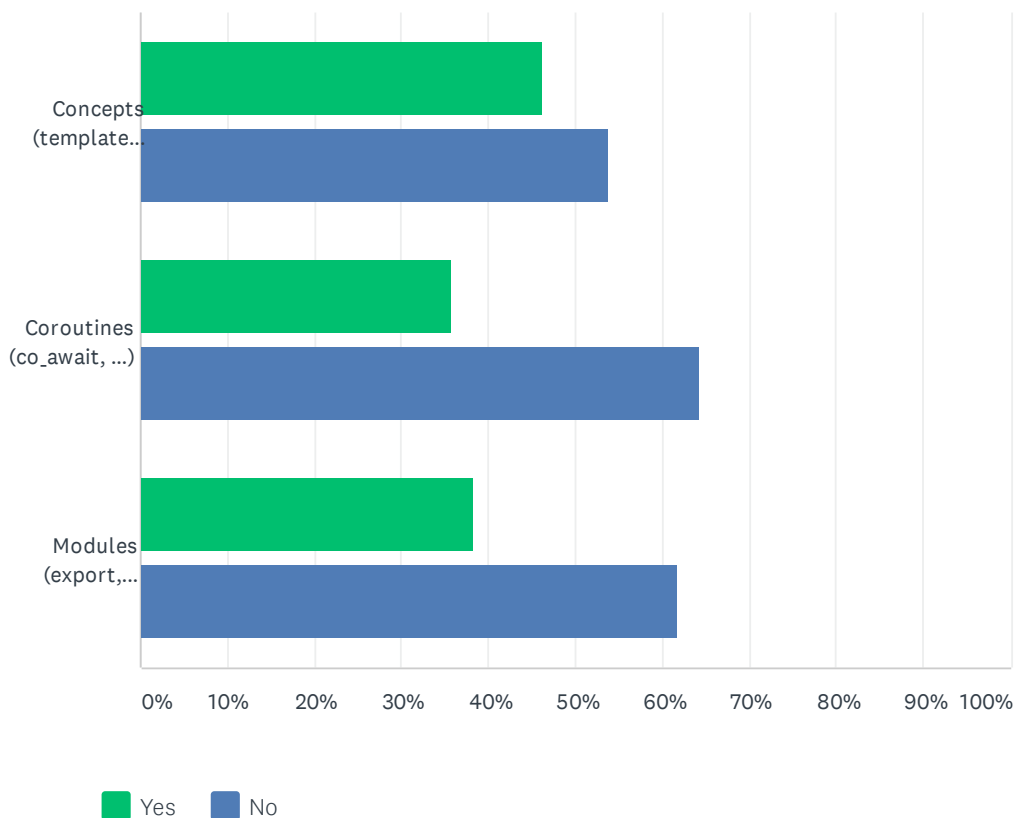
Answered: 1,847 Skipped: 26



ANSWER CHOICES	RESPONSES
Yes	50.19% 927
No	23.82% 440
Don't know	25.99% 480
TOTAL	1,847

Q13 Specifically for upcoming major C++20 features: In the next 12 months, does your current project plan to allow use of these C++20 features?

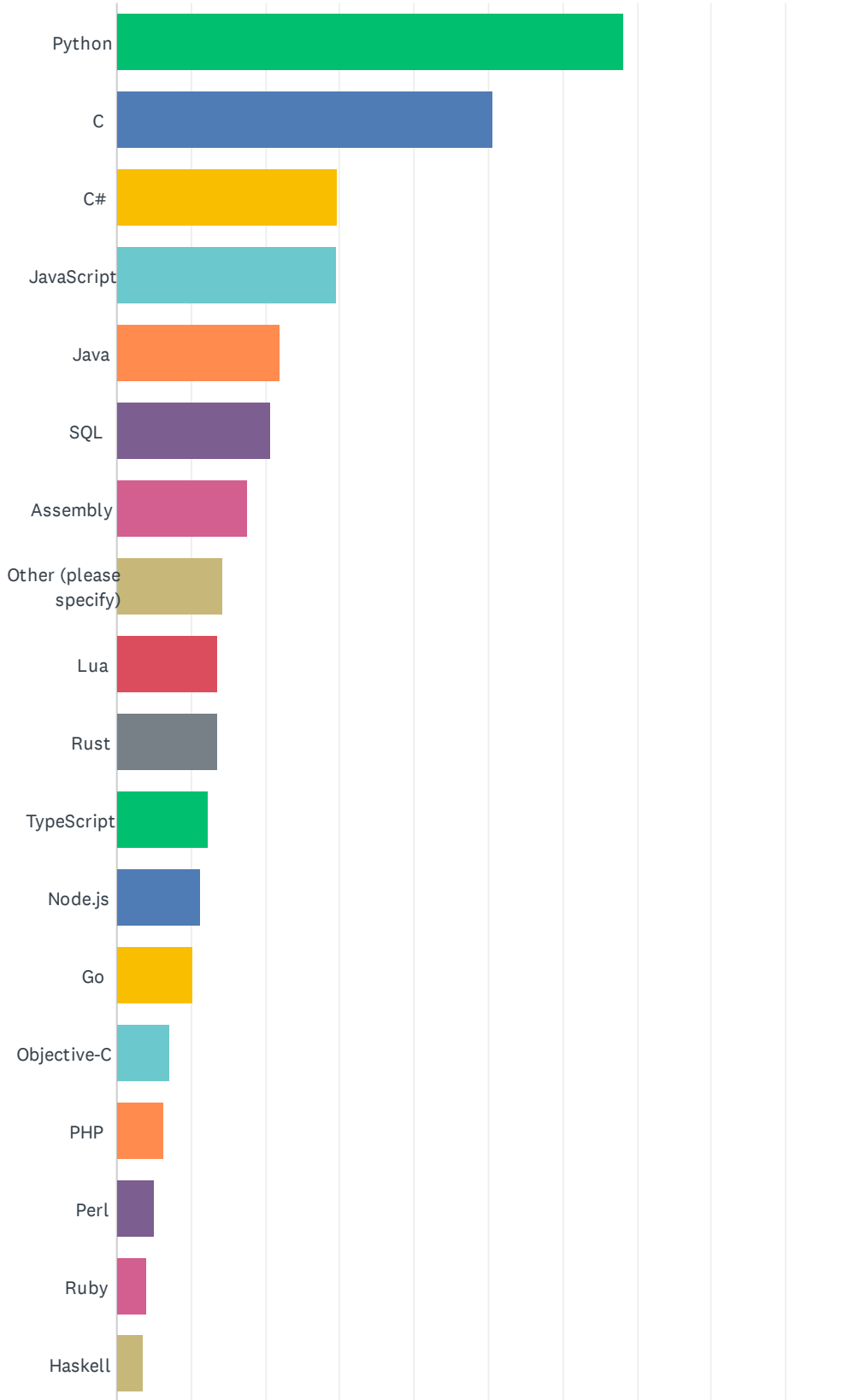
Answered: 1,793 Skipped: 80



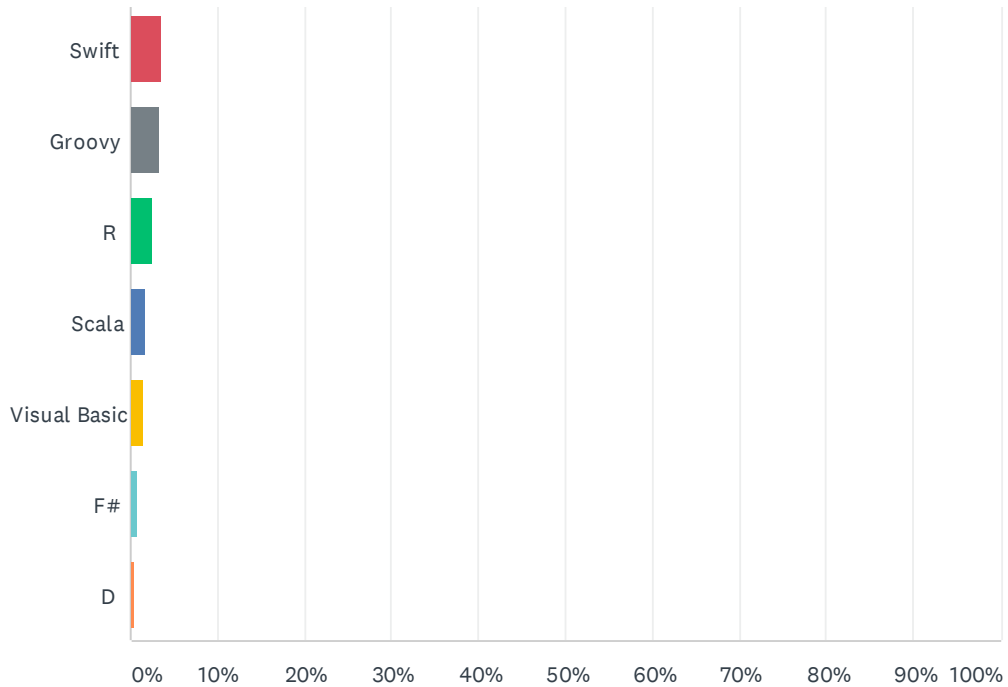
	YES	NO	TOTAL	WEIGHTED AVERAGE
Concepts (template constraints, requires, ...)	46.27% 825	53.73% 958	1,783	2.07
Coroutines (co_await, ...)	35.68% 633	64.32% 1,141	1,774	2.29
Modules (export, import, ...)	38.37% 683	61.63% 1,097	1,780	2.23

Q14 Besides C++, what programming languages/environments do you use in your current and recent projects? (select all that apply)

Answered: 1,828 Skipped: 45



2021 Annual C++ Developer Survey "Lite"

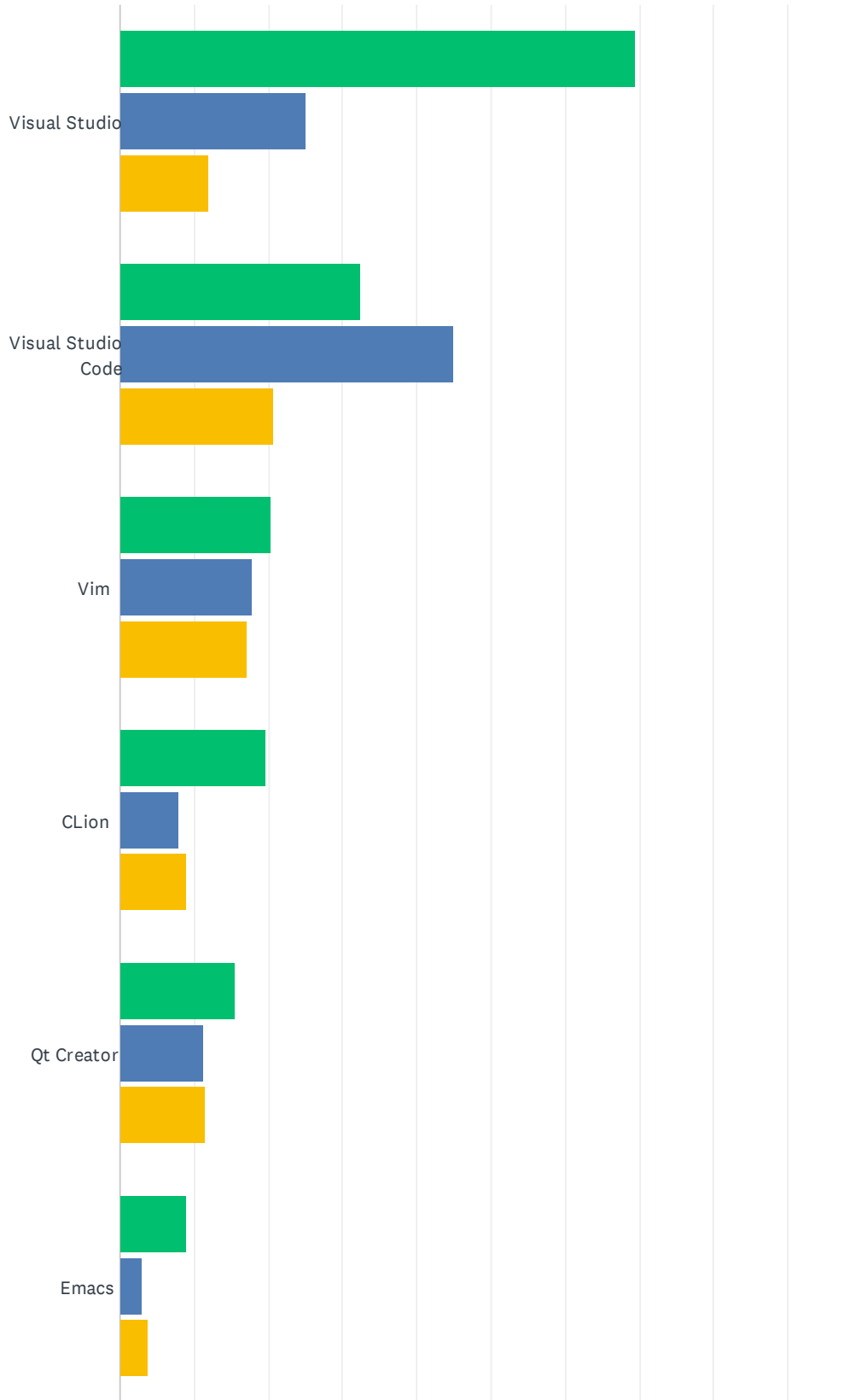


2021 Annual C++ Developer Survey "Lite"

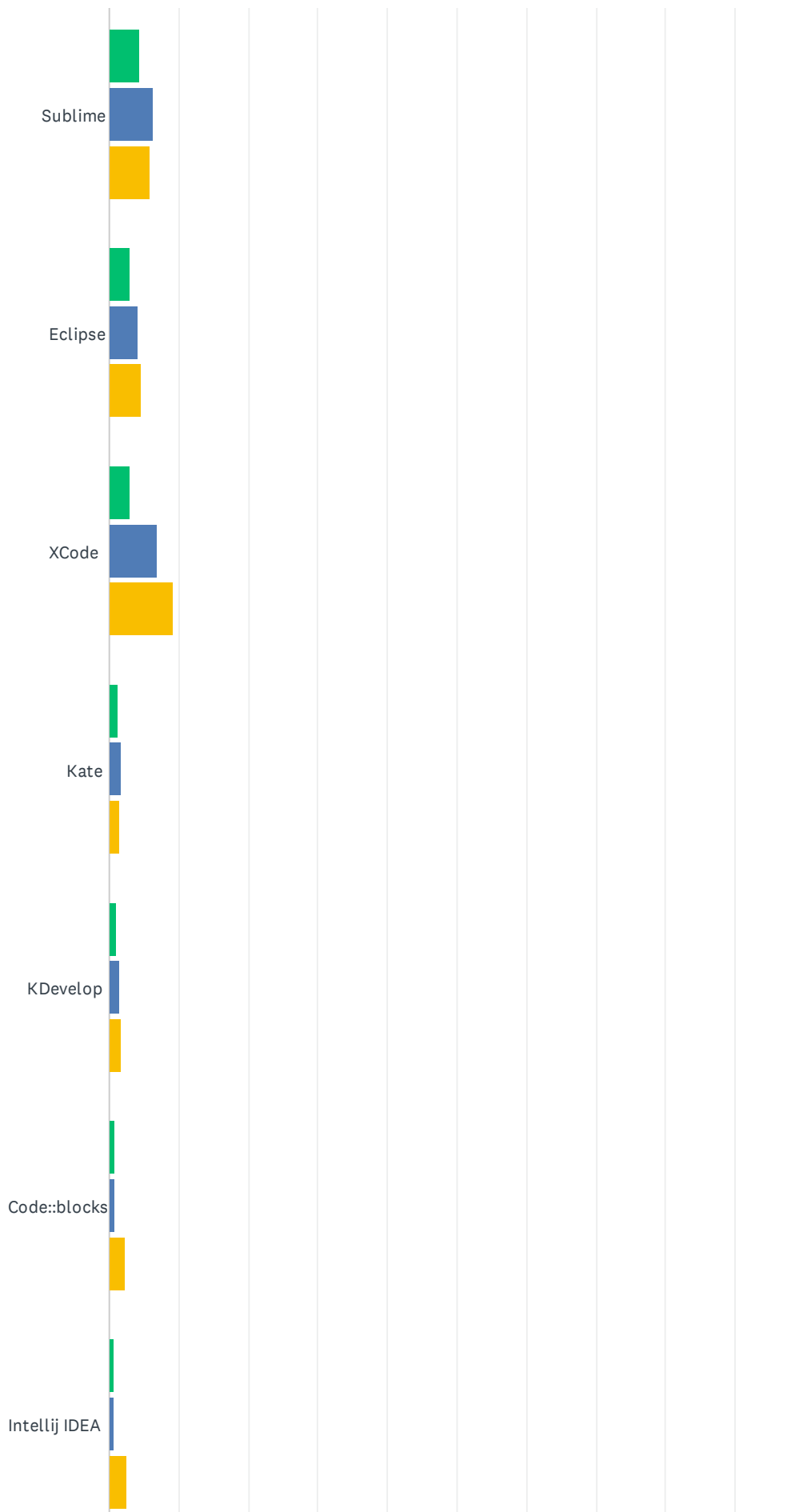
ANSWER CHOICES	RESPONSES	
Python	68.11%	1,245
C	50.66%	926
C#	29.76%	544
JavaScript	29.60%	541
Java	21.88%	400
SQL	20.62%	377
Assembly	17.56%	321
Other (please specify)	14.22%	260
Lua	13.57%	248
Rust	13.51%	247
TypeScript	12.31%	225
Node.js	11.21%	205
Go	10.28%	188
Objective-C	7.17%	131
PHP	6.18%	113
Perl	5.03%	92
Ruby	4.05%	74
Haskell	3.61%	66
Swift	3.50%	64
Groovy	3.39%	62
R	2.46%	45
Scala	1.70%	31
Visual Basic	1.42%	26
F#	0.77%	14
D	0.49%	9
Total Respondents: 1,828		

Q15 Which development environments (IDEs) or editors do you use for C++ development?

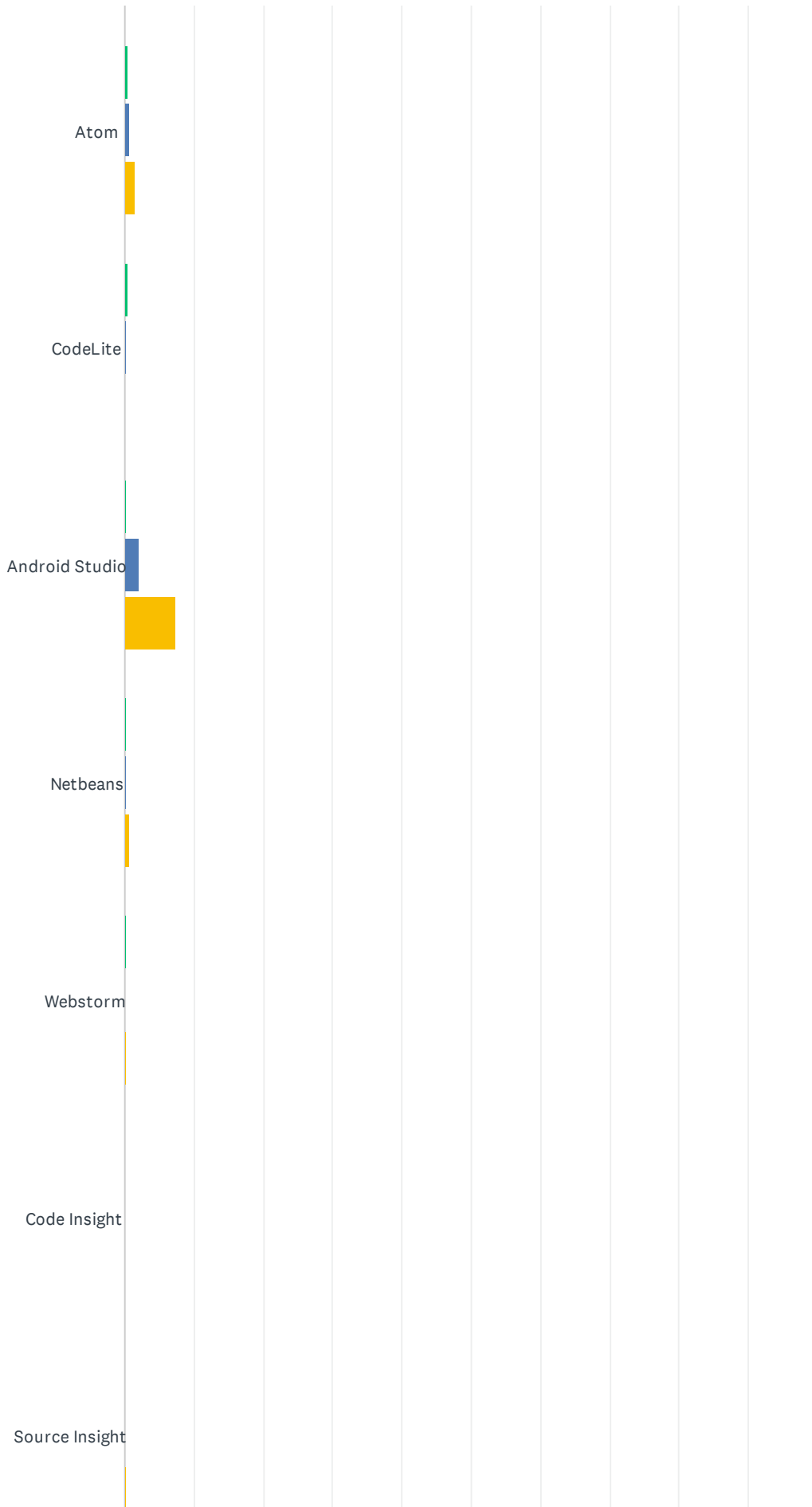
Answered: 1,858 Skipped: 15



2021 Annual C++ Developer Survey "Lite"



2021 Annual C++ Developer Survey "Lite"



2021 Annual C++ Developer Survey "Lite"



■ Primary
 ■ Secondary
 ■ Occasional

	PRIMARY	SECONDARY	OCCASIONAL	TOTAL	WEIGHTED AVERAGE
Visual Studio	65.20% 695	23.55% 251	11.26% 120	1,066	2.54
Visual Studio Code	33.10% 325	45.82% 450	21.08% 207	982	2.12
Vim	36.78% 203	32.07% 177	31.16% 172	552	2.06
CLion	53.70% 196	21.92% 80	24.38% 89	365	2.29
Qt Creator	40.21% 154	29.77% 114	30.03% 115	383	2.10
Emacs	57.69% 90	18.59% 29	23.72% 37	156	2.34
Sublime	26.38% 43	38.04% 62	35.58% 58	163	1.91
Eclipse	25.64% 30	35.90% 42	38.46% 45	117	1.87
XCode	15.26% 29	36.32% 69	48.42% 92	190	1.67
Kate	27.27% 12	38.64% 17	34.09% 15	44	1.93
KDevelop	26.19% 11	33.33% 14	40.48% 17	42	1.86
Code::blocks	19.51% 8	21.95% 9	58.54% 24	41	1.61
Intellij IDEA	15.38% 6	17.95% 7	66.67% 26	39	1.49
Atom	19.23% 5	23.08% 6	57.69% 15	26	1.62
CodeLite	62.50% 5	25.00% 2	12.50% 1	8	2.50
Android Studio	3.09% 3	20.62% 20	76.29% 74	97	1.27
Netbeans	23.08% 3	23.08% 3	53.85% 7	13	1.69
Webstorm	42.86% 3	14.29% 1	42.86% 3	7	2.00
Code Insight	0.00% 0	0.00% 0	0.00% 0	0	0.00
Source Insight	0.00% 0	0.00% 0	100.00% 3	3	1.00

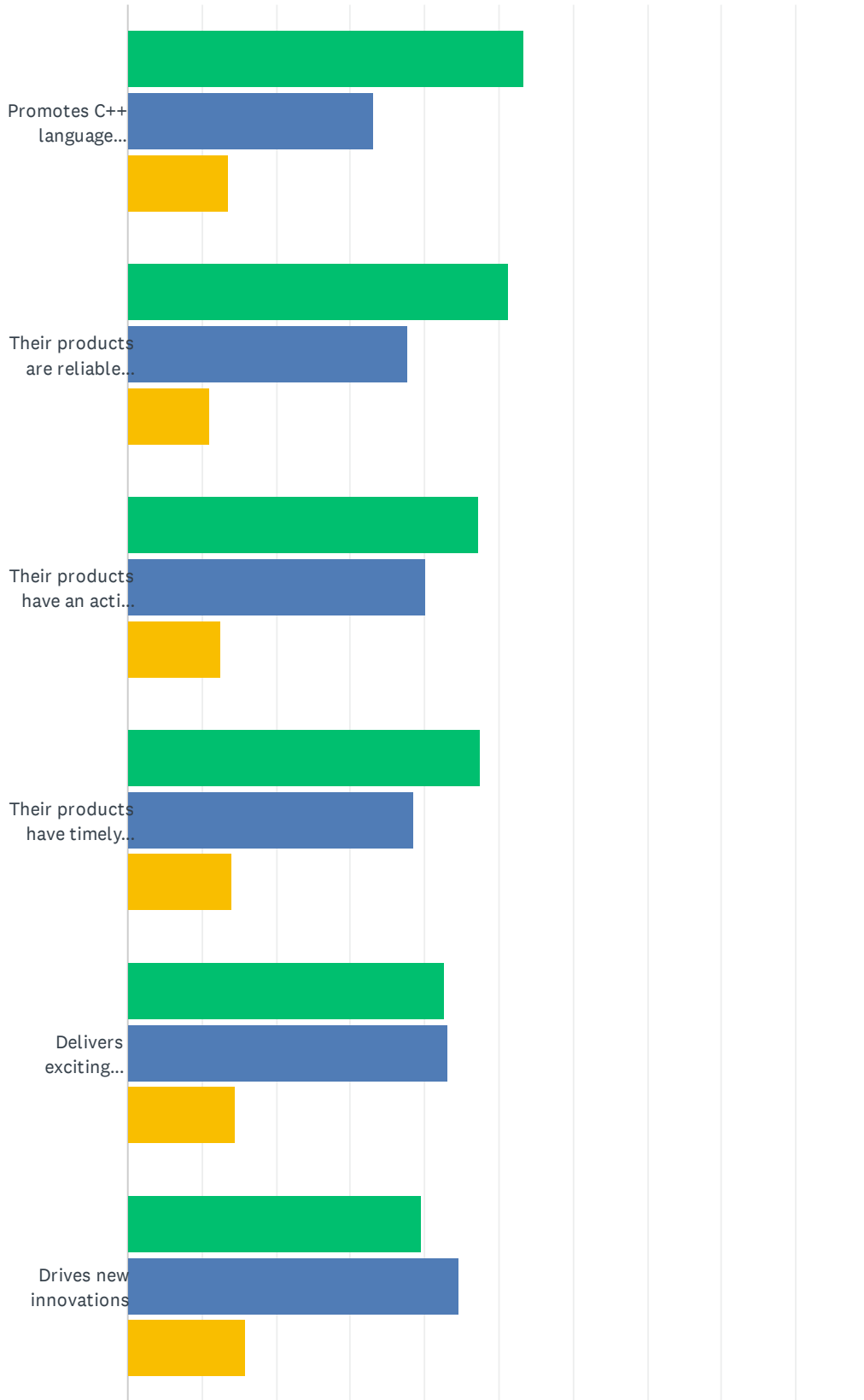
Q16 What organizations come to your mind the most when you think about C++? Why?

Answered: 1,021 Skipped: 852

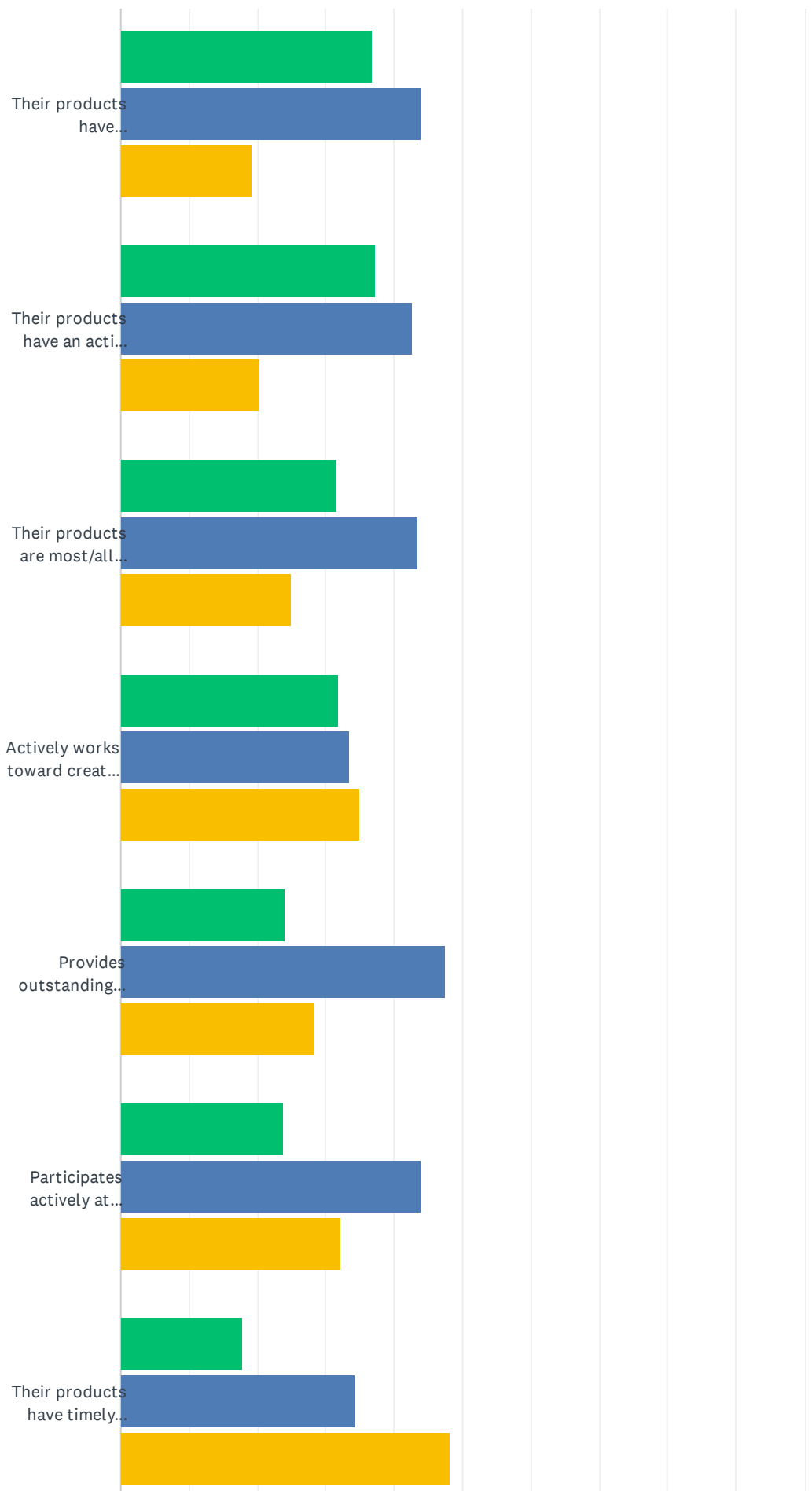
open source members community os projects Linux Unreal Engine N
C Foundation involved WG21 Gaming companies Google Facebook
Microsoft due making github Standard C think standard IDE Intel
Google Bloomberg Bloomberg Facebook companies Herb Sutter
CppCon LLVM GCC Yandex many Microsoft Visual talks
isocpp GCC C standard isocpp.org
standard committee Nvidia language
ISO committee Visual Studio LLVM clang compiler
Google Apple use ACCU ISO one C lot Microsoft
development Google code Boost Microsoft Apple
work organizations Qt good tools etc ISO C
compiler vendors Microsoft Google develop LLVM major
Google Microsoft Video game JetBrains Game studios
C committee since clang high performance committee
Standards Comittee None windows Apple know game compilers tools
libraries Facebook Google Qt Company GNU gcc use C KDE big include
GNU great ISO standards frameworks conferences large support
Epic Games

Q17 How important is each of these to you when you think about an organization's involvement in C++?

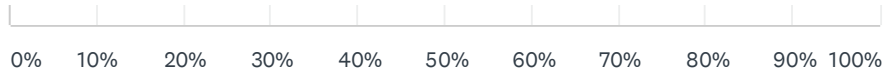
Answered: 1,672 Skipped: 201



2021 Annual C++ Developer Survey "Lite"



2021 Annual C++ Developer Survey "Lite"

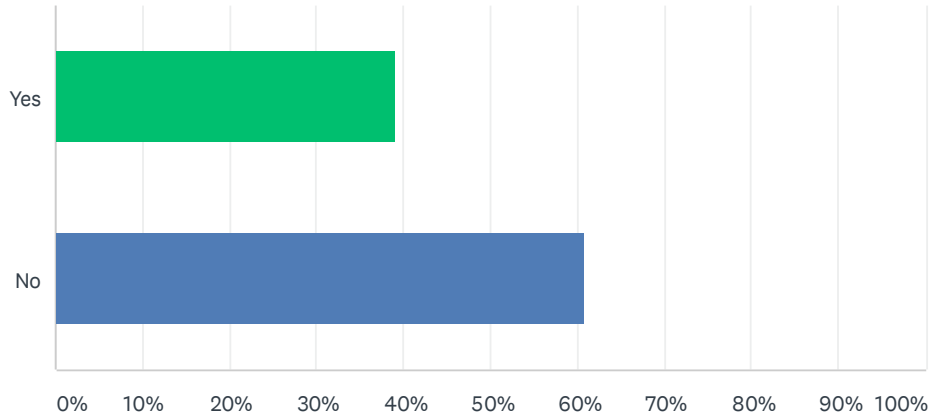


■ Very important
 ■ Somewhat important
 ■ Not important

	VERY IMPORTANT	SOMEWHAT IMPORTANT	NOT IMPORTANT	TOTAL	WEIGHTED AVERAGE
Promotes C++ language evolution in directions that help my work	53.37% 880	32.99% 544	13.64% 225	1,649	2.40
Their products are reliable and backward-compatible	51.25% 843	37.63% 619	11.12% 183	1,645	2.40
Their products have an active user community	47.35% 777	40.16% 659	12.49% 205	1,641	2.35
Their products have timely support for the latest C++ standard	47.57% 784	38.41% 633	14.02% 231	1,648	2.34
Delivers exciting solutions to common development problems	42.58% 697	43.07% 705	14.36% 235	1,637	2.28
Drives new innovations	39.54% 648	44.66% 732	15.80% 259	1,639	2.24
Their products have high-quality training materials	36.88% 600	43.88% 714	19.24% 313	1,627	2.18
Their products have an active open source community	37.16% 608	42.60% 697	20.23% 331	1,636	2.17
Their products are most/all open-sourced	31.63% 520	43.43% 714	24.94% 410	1,644	2.07
Actively works toward creating a more diverse and inclusive C++ community	31.75% 522	33.39% 549	34.85% 573	1,644	1.97
Provides outstanding customer support and servicing	23.97% 391	47.52% 775	28.51% 465	1,631	1.95
Participates actively at conferences (e.g., talks, booths)	23.82% 392	43.92% 723	32.26% 531	1,646	1.92
Their products have timely support for the latest C standard	17.70% 290	34.25% 561	48.05% 787	1,638	1.70

Q18 Is an organization's involvement in the C++ community a major factor in choosing their developer tools and services?

Answered: 1,704 Skipped: 169



ANSWER CHOICES	RESPONSES	
Yes	39.14%	667
No	60.86%	1,037
TOTAL		1,704

Q19 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: 1,242 Skipped: 631

simplify often know break dependency management party libraries
builds new features also go default really simple start problems new
easy existing Rust safe functions const default types dependencies
standard library CMake things error messages work will
support instead way backwards compatibility
compile times faster remove lot build system
help build times e.g time something better write
code much make even C improve use issues
language example library Reflection compiler think
add different standard exceptions
package manager C standard allow long need find
features STL modules concepts change build tools less
everything templates platforms projects development one still etc
provide want classes many bugs syntax standard package tools possible fix
programming including learn without package management