

	Language	Technique 1	Technique 2	OR	p-value
DeepSeek Coder 1B	R	Fine-tuning – Code Generation	Baseline	1.66	<0.001
DeepSeek Coder 7B	R	Baseline	Fine-tuning – Code Generation	1.42	<0.001
DeepSeek Coder 33B	R	Baseline	Fine-tuning – Code Generation	1.61	<0.001
Code Llama 7B	R	Baseline	Fine-tuning – Code Generation	1.02	0.805
Code Llama 13B	R	Fine-tuning – Code Generation	Baseline	1.21	0.001
DeepSeek Coder 1B	Racket	Fine-tuning – Code Generation	Baseline	7.56	<0.001
DeepSeek Coder 7B	Racket	Fine-tuning – Code Generation	Baseline	3.00	<0.001
DeepSeek Coder 33B	Racket	Baseline	Fine-tuning – Code Generation	1.54	<0.001
Code Llama 7B	Racket	Fine-tuning – Code Generation	Baseline	6.05	<0.001
Code Llama 13B	Racket	Fine-tuning – Code Generation	Baseline	2.78	<0.001
DeepSeek Coder 1B	R	In-context Learning – Few-shot Examples	Baseline	1.04	0.629
DeepSeek Coder 7B	R	In-context Learning – Few-shot Examples	Baseline	1.17	0.012
DeepSeek Coder 33B	R	In-context Learning – Few-shot Examples	Baseline	2.33	<0.001
Code Llama 7B	R	In-context Learning – Few-shot Examples	Baseline	1.13	0.087
Code Llama 13B	R	In-context Learning – Few-shot Examples	Baseline	2.05	<0.001
GitHub Copilot	R	In-context Learning – Few-shot Examples	Baseline	1.65	<0.001
DeepSeek Coder 1B	Racket	In-context Learning – Few-shot Examples	Baseline	1.75	<0.001
DeepSeek Coder 7B	Racket	In-context Learning – Few-shot Examples	Baseline	1.80	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Few-shot Examples	Baseline	1.36	<0.001
Code Llama 7B	Racket	In-context Learning – Few-shot Examples	Baseline	1.71	<0.001
Code Llama 13B	Racket	Baseline	In-context Learning – Few-shot Examples	1.22	0.013
GitHub Copilot	Racket	In-context Learning – Few-shot Examples	Baseline	1.18	0.059
DeepSeek Coder 1B	R	Baseline	In-context Learning – Translation Rules	1.17	0.131
DeepSeek Coder 7B	R	In-context Learning – Translation Rules	Baseline	1.05	0.508
DeepSeek Coder 33B	R	In-context Learning – Translation Rules	Baseline	1.54	<0.001
Code Llama 7B	R	Baseline	In-context Learning – Translation Rules	1.34	<0.001
Code Llama 13B	R	In-context Learning – Translation Rules	Baseline	1.37	<0.001
GitHub Copilot	R	In-context Learning – Translation Rules	Baseline	1.08	0.508
DeepSeek Coder 1B	Racket	Baseline	In-context Learning – Translation Rules	1.28	0.085
DeepSeek Coder 7B	Racket	Baseline	In-context Learning – Translation Rules	1.04	0.508
DeepSeek Coder 33B	Racket	In-context Learning – Translation Rules	Baseline	1.34	<0.001
Code Llama 7B	Racket	Baseline	In-context Learning – Translation Rules	1.03	0.775
Code Llama 13B	Racket	Baseline	In-context Learning – Translation Rules	1.17	0.116
GitHub Copilot	Racket	Baseline	In-context Learning – Translation Rules	1.08	0.508
DeepSeek Coder 1B	R	Baseline	In-context Learning – Translation Examples	1.03	0.696
DeepSeek Coder 7B	R	In-context Learning – Translation Examples	Baseline	1.38	<0.001
DeepSeek Coder 33B	R	In-context Learning – Translation Examples	Baseline	2.27	<0.001
Code Llama 7B	R	In-context Learning – Translation Examples	Baseline	1.54	<0.001
Code Llama 13B	R	In-context Learning – Translation Examples	Baseline	2.02	<0.001
GitHub Copilot	R	In-context Learning – Translation Examples	Baseline	1.99	<0.001
DeepSeek Coder 1B	Racket	In-context Learning – Translation Examples	Baseline	1.44	0.003
DeepSeek Coder 7B	Racket	In-context Learning – Translation Examples	Baseline	1.30	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Examples	Baseline	1.42	<0.001
Code Llama 7B	Racket	In-context Learning – Translation Examples	Baseline	1.37	0.001
Code Llama 13B	Racket	In-context Learning – Translation Examples	Baseline	1.28	<0.001
GitHub Copilot	Racket	In-context Learning – Translation Examples	Baseline	1.06	0.531
DeepSeek Coder 1B	R	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	1.28	<0.001
DeepSeek Coder 7B	R	Baseline	Pre-training & Fine-tuning – Code Translation and Generation	1.58	<0.001
DeepSeek Coder 33B	R	Baseline	Pre-training & Fine-tuning – Code Translation and Generation	1.53	<0.001
Code Llama 7B	R	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	1.14	0.044
Code Llama 13B	R	Baseline	Pre-training & Fine-tuning – Code Translation and Generation	1.06	0.340
DeepSeek Coder 1B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	7.97	<0.001
DeepSeek Coder 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	2.18	<0.001
DeepSeek Coder 33B	Racket	Baseline	Pre-training & Fine-tuning – Code Translation and Generation	1.98	<0.001
Code Llama 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	4.76	<0.001
Code Llama 13B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	1.82	<0.001
DeepSeek Coder 1B	R	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.38	<0.001
DeepSeek Coder 7B	R	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.25	<0.001
DeepSeek Coder 33B	R	Pre-training & Fine-tuning – Code Translation and Generation	Fine-tuning – Code Generation	1.08	0.237
Code Llama 7B	R	Pre-training & Fine-tuning – Code Translation and Generation	Fine-tuning – Code Generation	1.23	0.005
Code Llama 13B	R	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.46	<0.001
DeepSeek Coder 1B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	Fine-tuning – Code Generation	1.27	<0.001
DeepSeek Coder 7B	Racket	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.44	<0.001
DeepSeek Coder 33B	Racket	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.48	<0.001
Code Llama 7B	Racket	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.79	<0.001
Code Llama 13B	Racket	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.89	<0.001
DeepSeek Coder 1B	R	Fine-tuning – Code Generation	In-context Learning – Few-shot Examples	1.69	<0.001
DeepSeek Coder 7B	R	In-context Learning – Few-shot Examples	Fine-tuning – Code Generation	1.48	<0.001
DeepSeek Coder 33B	R	In-context Learning – Few-shot Examples	Fine-tuning – Code Generation	3.06	<0.001
Code Llama 7B	R	In-context Learning – Few-shot Examples	Fine-tuning – Code Generation	1.12	0.069
Code Llama 13B	R	In-context Learning – Few-shot Examples	Fine-tuning – Code Generation	1.48	<0.001
DeepSeek Coder 1B	Racket	Fine-tuning – Code Generation	In-context Learning – Few-shot Examples	4.85	<0.001
DeepSeek Coder 7B	Racket	Fine-tuning – Code Generation	In-context Learning – Few-shot Examples	1.90	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Few-shot Examples	Fine-tuning – Code Generation	2.14	<0.001
Code Llama 7B	Racket	Fine-tuning – Code Generation	In-context Learning – Few-shot Examples	5.75	<0.001
Code Llama 13B	Racket	Fine-tuning – Code Generation	In-context Learning – Few-shot Examples	3.44	<0.001
DeepSeek Coder 1B	R	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Few-shot Examples	1.29	<0.001
DeepSeek Coder 7B	R	In-context Learning – Few-shot Examples	Pre-training & Fine-tuning – Code Translation and Generation	1.64	<0.001
DeepSeek Coder 33B	R	In-context Learning – Few-shot Examples	Pre-training & Fine-tuning – Code Translation and Generation	2.79	<0.001
Code Llama 7B	R	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Few-shot Examples	1.03	0.629
Code Llama 13B	R	In-context Learning – Few-shot Examples	Pre-training & Fine-tuning – Code Translation and Generation	1.93	<0.001
DeepSeek Coder 1B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Few-shot Examples	5.76	<0.001
DeepSeek Coder 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Few-shot Examples	1.38	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Few-shot Examples	Pre-training & Fine-tuning – Code Translation and Generation	2.47	<0.001
Code Llama 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Few-shot Examples	3.96	<0.001
Code Llama 13B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Few-shot Examples	1.98	<0.001
DeepSeek Coder 1B	R	Fine-tuning – Code Generation	In-context Learning – Translation Rules	1.95	<0.001
DeepSeek Coder 7B	R	In-context Learning – Translation Rules	Fine-tuning – Code Generation	1.41	<0.001
DeepSeek Coder 33B	R	In-context Learning – Translation Rules	Fine-tuning – Code Generation	2.18	<0.001
Code Llama 7B	R	Fine-tuning – Code Generation	In-context Learning – Translation Rules	1.21	0.001
Code Llama 13B	R	In-context Learning – Translation Rules	Fine-tuning – Code Generation	1.07	0.281
DeepSeek Coder 1B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Rules	9.35	<0.001
DeepSeek Coder 7B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Rules	2.48	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Rules	Fine-tuning – Code Generation	2.03	<0.001
Code Llama 7B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Rules	5.74	<0.001
Code Llama 13B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Rules	3.10	<0.001
DeepSeek Coder 1B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.18	0.046
DeepSeek Coder 7B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.10	0.103
DeepSeek Coder 33B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.79	<0.001
Code Llama 7B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.42	<0.001
Code Llama 13B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.42	<0.001
GitHub Copilot	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.56	<0.001
DeepSeek Coder 1B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.99	<0.001
DeepSeek Coder 7B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.72	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.04	0.475
Code Llama 7B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.58	<0.001
Code Llama 13B	Racket	In-context Learning – Translation Rules	In-context Learning – Few-shot Examples	1.06	0.475
GitHub Copilot	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.23	0.009
DeepSeek Coder 1B	R	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.10	0.277
DeepSeek Coder 7B	R	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.28	<0.001
DeepSeek Coder 33B	R	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.57	<0.001
Code Llama 7B	R	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.92	<0.001
Code Llama 13B	R	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.31	<0.001
GitHub Copilot	R	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.70	<0.001
DeepSeek Coder 1B	Racket	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.79	<0.001
DeepSeek Coder 7B	Racket	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.32	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.06	0.302
Code Llama 7B	Racket	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.32	0.002
Code Llama 13B	Racket	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.46	<0.001
GitHub Copilot	Racket	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.15	0.115
DeepSeek Coder 1B	R	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Rules	1.45	<0.001
DeepSeek Coder 7B	R	In-context Learning – Translation Rules	Pre-training & Fine-tuning – Code Translation and Generation	1.67	<0.001
DeepSeek Coder 33B	R	In-context Learning – Translation Rules	Pre-training & Fine-tuning – Code Translation and Generation	2.03	<0.001
Code Llama 7B	R	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Rules	1.35	<0.001
Code Llama 13B	R	In-context Learning – Translation Rules	Pre-training & Fine-tuning – Code Translation and Generation	1.38	<0.001
DeepSeek Coder 1B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Rules	8.01	<0.001
DeepSeek Coder 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Rules	1.91	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Rules	Pre-training & Fine-tuning – Code Translation and Generation	2.47	<0.001
Code Llama 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Rules	4.33	<0.001
Code Llama 13B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Rules	1.95	<0.001
DeepSeek Coder 1B	R	Fine-tuning – Code Generation	In-context Learning – Translation Examples	1.71	<0.001
DeepSeek Coder 7B	R	In-context Learning – Translation Examples	Fine-tuning – Code Generation	1.63	<0.001
DeepSeek Coder 33B	R	In-context Learning – Translation Examples	Fine-tuning – Code Generation	2.95	<0.001
Code Llama 7B	R	In-context Learning – Translation Examples	Fine-tuning – Code Generation	1.33	<0.001
Code Llama 13B	R	In-context Learning – Translation Examples	Fine-tuning – Code Generation	1.35	<0.001
DeepSeek Coder 1B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Examples	6.15	<0.001
DeepSeek Coder 7B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Examples	2.31	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Examples	Fine-tuning – Code Generation	2.17	<0.001
Code Llama 7B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Examples	6.20	<0.001
Code Llama 13B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Examples	2.29	<0.001
DeepSeek Coder 1B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.08	0.416
DeepSeek Coder 7B	R	In-context Learning – Translation Examples	In-context Learning – Few-shot Examples	1.17	0.018
DeepSeek Coder 33B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.26	<0.001
Code Llama 7B	R	In-context Learning – Translation Examples	In-context Learning – Few-shot Examples	1.26	0.003
Code Llama 13B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.14	0.087
GitHub Copilot	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.03	0.769
DeepSeek Coder 1B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.32	0.018
DeepSeek Coder 7B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.37	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Examples	In-context Learning – Few-shot Examples	1.02	0.769
Code Llama 7B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.28	0.046
Code Llama 13B	Racket	In-context Learning – Translation Examples	In-context Learning – Few-shot Examples	1.61	<0.001
GitHub Copilot	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.11	0.277
DeepSeek Coder 1B	R	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Examples	1.34	<0.001
DeepSeek Coder 7B	R	In-context Learning – Translation Examples	Pre-training & Fine-tuning – Code Translation and Generation	1.84	<0.001
DeepSeek Coder 33B	R	In-context Learning – Translation Examples	Pre-training & Fine-tuning – Code Translation and Generation	2.47	<0.001
Code Llama 7B	R	In-context Learning – Translation Examples	Pre-training & Fine-tuning – Code Translation and Generation	1.14	0.032
Code Llama 13B	R	In-context Learning – Translation Examples	Pre-training & Fine-tuning – Code Translation and Generation	1.73	<0.001
DeepSeek Coder 1B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Examples	8.94	<0.001
DeepSeek Coder 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Examples	1.65	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Examples	Pre-training & Fine-tuning – Code Translation and Generation	2.67	<0.001
Code Llama 7B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Examples	4.68	<0.001
Code Llama 13B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Examples	1.45	<0.001