

	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	1.64	<0.001
Code Llama 7B	R	Fine-tuning – Code Generation	Baseline	1.12	0.078
Code Llama 13B	R	Fine-tuning – Code Generation	Baseline	1.21	0.001
DeepSeek Coder 1B	Racket	Fine-tuning – Code Generation	Baseline	8.80	<0.001
DeepSeek Coder 7B	Racket	Fine-tuning – Code Generation	Baseline	3.00	<0.001
DeepSeek Coder 33B	Racket	Baseline	Fine-tuning – Code Generation	1.42	<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	0.609
DeepSeek Coder 7B	R	In-context Learning – Few-shot Examples	Baseline	1.17	0.009
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	0.073
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	1.94	<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	0.009
GitHub Copilot	Racket	In-context Learning – Few-shot Examples	Baseline	1.14	0.009
DeepSeek Coder 1B	R	Baseline	In-context Learning – Translation Rules	1.17	0.100
DeepSeek Coder 7B	R	In-context Learning – Translation Rules	Baseline	1.05	0.483
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	1.21	<0.001
DeepSeek Coder 1B	Racket	Baseline	In-context Learning – Translation Rules	1.28	0.059
DeepSeek Coder 7B	Racket	Baseline	In-context Learning – Translation Rules	1.04	0.483
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	0.770
Code Llama 13B	Racket	Baseline	In-context Learning – Translation Rules	1.17	0.086
GitHub Copilot	Racket	In-context Learning – Translation Rules	Baseline	1.08	0.144
DeepSeek Coder 1B	R	Baseline	In-context Learning – Translation Examples	1.03	0.679
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	1.81	<0.001
DeepSeek Coder 1B	Racket	In-context Learning – Translation Examples	Baseline	1.44	0.002
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	1.33	<0.001
DeepSeek Coder 1B	R	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	1.48	<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	1.29	<0.001
Code Llama 13B	R	Pre-training & Fine-tuning – Code Translation and Generation	Baseline	1.05	0.404
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	3.15	<0.001
DeepSeek Coder 33B	Racket	Baseline	Pre-training & Fine-tuning – Code Translation and Generation	1.64	<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	2.31	<0.001
DeepSeek Coder 1B	R	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.19	0.035
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	1.07	0.283
Code Llama 7B	R	Pre-training & Fine-tuning – Code Translation and Generation	Fine-tuning – Code Generation	1.25	0.005
Code Llama 13B	R	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.24	0.005
DeepSeek Coder 1B	Racket	Pre-training & Fine-tuning – Code Translation and Generation	Fine-tuning – Code Generation	1.04	0.502
DeepSeek Coder 7B	Racket	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.19	0.006
DeepSeek Coder 33B	Racket	Fine-tuning – Code Generation	Pre-training & Fine-tuning – Code Translation and Generation	1.15	0.013
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	1.29	<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	3.15	<0.001
Code Llama 7B	R	Fine-tuning – Code Generation	In-context Learning – Few-shot Examples	1.01	0.952
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	6.18	<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	1.95	<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	1.45	<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	1.16	0.010
Code Llama 13B	R	In-context Learning – Few-shot Examples	Pre-training & Fine-tuning – Code Translation and Generation	1.67	<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	1.79	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Few-shot Examples	Pre-training & Fine-tuning – Code Translation and Generation	2.14	<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	2.66	<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	2.23	<0.001
Code Llama 7B	R	Fine-tuning – Code Generation	In-context Learning – Translation Rules	1.37	<0.001
Code Llama 13B	R	In-context Learning – Translation Rules	Fine-tuning – Code Generation	1.07	0.251
DeepSeek Coder 1B	Racket	Fine-tuning – Code Generation	In-context Learning – Translation Rules	14.01	<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	1.88	<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	0.042
DeepSeek Coder 7B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.10	0.098
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	1.75	<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	0.440
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	0.440
GitHub Copilot	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Rules	1.05	0.330
DeepSeek Coder 1B	R	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.10	0.245
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	1.44	<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	0.272
Code Llama 7B	Racket	In-context Learning – Translation Examples	In-context Learning – Translation Rules	1.32	0.001
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	1.22	<0.001
DeepSeek Coder 1B	R	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Rules	1.73	<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	1.52	<0.001
Code Llama 13B	R	In-context Learning – Translation Rules	Pre-training & Fine-tuning – Code Translation and Generation	1.23	<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	2.32	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Rules	Pre-training & Fine-tuning – Code Translation and Generation	1.98	<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	2.63	<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	2.79	<0.001
Code Llama 7B	R	In-context Learning – Translation Examples	Fine-tuning – Code Generation	1.18	0.005
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	8.08	<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	2.06	<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	0.346
DeepSeek Coder 7B	R	In-context Learning – Translation Examples	In-context Learning – Few-shot Examples	1.17	0.011
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	0.002
Code Llama 13B	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.14	0.058
GitHub Copilot	R	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.45	<0.001
DeepSeek Coder 1B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.32	0.011
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	0.759
Code Llama 7B	Racket	In-context Learning – Few-shot Examples	In-context Learning – Translation Examples	1.28	0.029
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 – Translation Examples	In-context Learning – Few-shot Examples	1.15	0.011
DeepSeek Coder 1B	R	Pre-training & Fine-tuning – Code Translation and Generation	In-context Learning – Translation Examples	1.51	<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	1.01	0.844
Code Llama 13B	R	In-context Learning – Translation Examples	Pre-training & Fine-tuning – Code Translation and Generation	1.54	<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	2.14	<0.001
DeepSeek Coder 33B	Racket	In-context Learning – Translation Examples	Pre-training & Fine-tuning – Code Translation and Generation	2.39	<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	1.93	<0.001