New York University

CSCI-UA.0202-003: Operating Systems (Undergrad): Fall 2025

Quiz 2

- Write your full name on both:
  - the bubble sheet in the "Name" field
  - the quiz booklet
- Write your NYU NetID on the quiz booklet and the bubble sheet in the "ID" field
- Use a #2 pencil to fill in your answers on the bubble sheet (preferred, but you can also use a pen)
- This quiz contains 6 questions only. Each question has choices from A to D
- Fill the bubbles completely by darkening the entire circle, as shown in the example
- Only mark answers for questions 1-6. Do not mark any bubbles beyond question 6
- Choose only one answer per question
- Submit your bubble sheet **together with your quiz booklet**

Name:

NetId:

1. A "critical section" is best defined as:
   (A) A section of code that is executed by only the main thread.
   (B) The most computationally expensive part of a program.
   (C) A piece of code that accesses a shared resource and must not be executed concurrently by more than one thread.
   (D) A section of code that, once started, cannot be interrupted by the OS scheduler.

2. In a C program with the function signature `int main(int argc, char** argv)`, what does `argv[0]` typically represent?
   (A) The number of command-line arguments.
   (B) The first argument provided by the user after the program name.
   (C) A null pointer marking the end of the argument list.
   (D) The name used to execute the program.

3. Based on the threading interface `tid thread_create(void (*fn)(void *), void *arg);`, what is the primary role of the `fn` parameter?
   (A) It's a pointer to the function that the new thread will begin executing.
   (B) It's a pointer to a block of memory to be used as the new thread's stack.
   (C) It's a unique identifier for the new thread.
   (D) It's an integer specifying the new thread's priority.

4. After setting a breakpoint in your code and using the `run` command, GDB stops at the specified line. Which command should you use to view the function call stack (i.e., the list of functions that have been called to reach the current point)?
   (A) `next` or `n`
   (B) `print` or `p`
   (C) `continue` or `c`
   (D) `backtrace` or `bt`

5. Consider the following C code where two threads concurrently execute the `update_stats` function exactly once on the shared global `player_stats` struct.

```c
// Shared global data
struct Stats {
    int score;
    int games_played;
} player_stats = {1000, 50};


// This function is executed by two threads concurrently
void update_stats(void *ignored) {
    // Each thread finds a new item, worth 10 points
    player_stats.score = player_stats.score + 10;

    // A game is completed after finding an item
    player_stats.games_played = player_stats.games_played + 1;
}
```

The initial state of `player_stats` is `{score: 1000, games_played: 50}`. The expected final state without a race condition is `{score: 1020, games_played: 52}`. Which of the following states is a **possible** outcome that can only be explained by a race condition?
(A) `{score: 1020, games_played: 51}`
(B) `{score: 1000, games_played: 52}`
(C) `{score: 1020, games_played: 53}`
(D) All of the above are possible race condition outcomes.

6. According to the lecture, which of the following resources are typically shared among all threads within a single process?
(A) The stack and registers
(B) The program counter for each thread
(C) The code segment, data segment, and open files
(D) The Thread Control Block (TCB)