Applications written in Brook/Brooktran are compiled at two levels (High Level Compiler (HLC) and Low Level Compiler (LLC)). The outputs of HLC and LLC can be tested for correctness and performance using the SVM and Merrimac simulators.

HLC compiles programs written in Brook/Brooktran into SVM code. Applications written in Brooktran are represented as R-Stream IR which is optimized using several universal and Merrimac-specific optimizations. Finally, R-Stream IR is converted into SVM code in the code generation phase. For testing the correctness of Brook code, a tool (SVM stream ISA) can be used to compile Brook to C. The C code can then be compiled and run.

The SVM code generated by HLC is a R-Stream Intermediate Representation (IR) which is then compiled to kernelC (Merrimac-specific language) using cTool and then compiled to micro-code. The simulator stores these dependencies in the form of a scoreboard (stream scheduler). The kernelC code generated by HLC can be used to simulate the performance of the algorithm on Merrimac.

The high level compiler generates kernels from the Brook code. These kernels perform computations on streams. The outputs of these kernels are then processed by the low level compiler, and the micro-code generated by the low level compiler is then simulated on the Merrimac simulator.

Illustrative example:

```c
#define commune (Brook) (Brook)

void kernel weightedSum(stream float image_in[3][3], out stream float image_out)
{
    for (int i = 0; i < 3; i++)
        for (int j = 0; j < 3; j++)
            image_out[i][j] = image_in[i][j] + image_in[i + 1][j] + image_in[i][j + 1];
}
```

Current status/Future work:

- **High Level Compiler**
  - R-Stream 1.x: Samples streamID, streamID, streamID, streamID.
  - HLC 2.0: Under active development.
  - Merrimac-specific optimizations to be integrated with R-Stream 2.0.

- **Low Level Compiler**
  - SVM kernels compiled to generate Merrimac stream ISA.
  - Support for both HLC and LLC.
  - SVMGenerate debug information for every instruction in the Merrimac simulator.
  - LLC, HLC, and the Merrimac simulator are integrated.