SUMMARY

The purpose of this summary is to present our main results concisely so that they may be referred to with ease.

Part I

Chapter 2

Theorem 2.2 *Suppose every 3-connected CBP graph G is hamiltonian. Then G has at least* 6 *Hamilton cycles.*

Corollary 2.1 *Suppose every 3-connected CBP graph G is hamiltonian. Then every edge of G lies on at least* 4 *Hamilton cycles.*

Theorem 2.3 *Suppose every 3-connected CBP graph G is hamiltonian. Let G be a CBP graph with connectivity 2. If G is hamiltonian, then G has at least* 16 *Hamilton cycles.*

Theorem 2.4 *Suppose every 3-connected CBP graph G is hamiltonian. Suppose G is of cyclic connectivity 3. Then G has at least* 12 *Hamilton cycles.*

Theorem 2.5 *Suppose every 3-connected CBP graph G is hamiltonian. Suppose G is of cyclic connectivity 4. Then G has at least* 6 *Hamilton cycles.*

Chapter 3

Conjecture 3.1 *Let G be a* 3*-connected CBP hamiltonian graph. Then, for any two edges x and y on the same face of G, there is a Hamilton cycle passing through x and y, and another one passing through x but avoiding y.*

Theorem 3.2 *Let G be a 3-connected CBP graph which is not the cube. Then G is a merger of an s-planar graph having the $\mathcal{A}$-property and the ladder graph L_k for some $k \geq 2$.*

Theorem 3.3 *Barnette's conjecture is equivalent to Conjecture 3.1.*

Theorem 3.4 *Suppose every 3-connected CBP graph is hamiltonian. Let G be a CBP graph. Then G has precisely six Hamilton cycles if and only if G is the cube.*

Theorem 3.5 *Suppose every 3-connected CBP graph is hamiltonian. Let G be a CBP graph with cyclic connectivity 3. Then G has precisely twelve Hamilton cycles if and only if G is the graph in Figure 2.4.*

Corollary 3.1 *Suppose every 3-connected CBP graph is hamiltonian. Then every CBP graph with cyclic connectivity 3 has precisely $4m$ Hamilton cycles for some $m \geq 3$.*

Part II

Chapter 4

Theorem 4.7 *The $m \times n$ chessboard with $m \leq n$ admits an open knight's tour unless one or more of the following conditions holds:*

(i) $m = 1$ or 2;

(ii) $m = 3$ and $n = 3, 5, 6$; or

(iii) $m = 4$ and $n = 4$.

Theorem 4.8 *Suppose $m = a + b + 2t + 1$ where $0 \leq t \leq a - 1$. Then the $m \times n$ chessboard admits no closed (a, b)-knight's tour.*

Theorem 4.9 *Suppose $m = a(k + 2l)$ where $1 \leq l \leq \frac{k}{2}$. Then the $m \times n$ chessboard admits no closed (a, ak)-knight's tour.*

Theorem 4.10 *Suppose $m = 2(ak + l)$ where $1 \leq k \leq l \leq a$. Then the $m \times n$ chessboard admits no closed $(a, a + 1)$-knight's tour.*

Theorem 4.11 *Suppose* $m = 2a + 2t + 1$ *where* $1 \leq t \leq a - 1$. *Then the* $m \times n$ *chessboard admits no closed* $(a, a+1)$*-knight's tour.*

Chapter 5

Theorem 5.5 *The* $5k \times n$ *chessboard where* $(5k, n) \neq (5, 18)$ *admits a closed (2,3)-knight's tour if and only if*

(i) $k = 1$ *and* $n \geq 16$; *or*

(ii) $k = 2$ *and* $n \geq 10$ *and* $n \neq 12$; *or*

(iii) $k \geq 3$ *is odd and* $n \geq 10$ *is even and* $n \neq 12$; *or*

(iv) $k \geq 4$ *is even and* $n = 5, 9, 10, 11$ *or* $n \geq 13$.